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## INDOOR AIR QUALITY INVESTIGATION

Bennington State Office Building  
1 Veterans Memorial Way  
Bennington, Vermont

### Prepared For:

Vermont Department of Buildings and General Services  
Governor Aiken Avenue  
Montpelier, VT 05602

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## 1. BACKGROUND INFORMATION

The IAQ investigation was performed in response to reported adverse health symptoms experienced by several employees working within various areas of the building. The building houses several different State of Vermont programs and services including Family Court, Social Welfare, Probation and Parole, Vocational Rehabilitation, Department of Corrections, Department of Employment and Training, Family Services, States Attorney, Child Support and District Court. ATC understands that the occupants of the Bennington State Office Building have reported adverse health effects which they have related to poor IAQ for a period of over 10 years. There have been periodic reports of musty odors in the Courtrooms and other areas of the building. Several IAQ investigations have been conducted in the past which have not identified building related contaminants. Recent occupant reports have indicated that five or six current or former building occupants have diagnosed cases of Sarcoidosis.

The Vermont Department of Health (VDH) is involved with investigating the IAQ in this building. This IAQ investigation's scope of work was developed based on specific requests from the VDH. In addition, the VDH has conducted an occupant survey to determine if there are patterns in the health symptoms reported. The VDH in collaboration with the National Institute for Occupation Safety and Health (NIOSH) is conducting medical screening of building employees.

There are reports of a contractor applying the pesticide Permethrin outside the building sometime in 2000 which was transported into the building via the HVAC system. There was a sewer backup event via a toilet overflow in the Probation and Parole area of the building in February 2006. There have been periodic reports of boiler exhaust odors in the building. These reports are associated with two potential sources: the roof top HVAC units re-entrainment of boiler exhaust from the exterior stack; and from incomplete wall penetration seals allowing for boiler exhaust odors from inside the boiler room to pass into adjacent areas of the building.

This investigation included a visual inspection, general indoor air quality sampling (temperature, relative humidity, carbon dioxide, carbon monoxide and total volatile organic compounds), total airborne dust sampling, microbial dust sampling, beryllium and lead in dust sampling, and wipe sampling for Permethrin. In addition, seven day sampling was conducted in ten locations for temperature, relative humidity, carbon monoxide, carbon dioxide and total dust. ATC also conducted qualitative air flow measurements in the boiler room area utilizing smoke tubes.

**Appendix A** of this report contains Figure 1, the room and sample location diagram.

As reported by the Department of Buildings and General Services (BGS), the Bennington State Office Building is comprised of an original 1978 single story building and a three story addition constructed in 1990. The 1978 portion of the building is approximately 26,000 square feet in area and constructed with a poured concrete slab on grade. The 1978 portion of the building is of steel and brick construction with stationary windows and roof top HVAC units. There has been renovations to the original 1978 HVAC systems in 2000 (all areas exclusive of courthouse) and in the courthouse portion in 2006. The roof on the 1978 portion of the building was

replaced in 2002 due to roof leaks. There are current reports of roof leaks in the facility. The 1990 three story addition is approximately 39,000 square feet in area (total of three floors) and constructed slab on grade of steel and brick with roof top HVAC units.

## **2. VISUAL OBSERVATIONS**

Thomas Broido of ATC conducted a walk-through of the building on August 7, 2006 with representatives of BGS, VDH, building occupants and the Vermont State Employees Association.

The visual observations included the identification of numerous water stained suspended ceiling tiles located throughout the facility. A few water stained ceiling tiles contained visually apparent microbial growth. These water stained ceiling tiles were reportedly from a number of sources including leaking valves, leaking sprinkler lines and roof leaks. The BGS reported that they had been actively replacing the leaking valves since the spring of 2006 but had not yet replaced the stained ceiling tiles. A leaking sprinkler line was observed by ATC above the ceiling in the back entranceway behind Court Room A. While there was widespread visual evidence of water damaged suspended ceiling tiles, there was minimal visual evidence of water stained gypsum wallboard (GWB) and visually apparent microbial growth was not observed on GWB during the building walkthrough.

The suspended ceiling tiles and carpeted wall coverings in the Courthouse areas appeared to be bowed. This type of bowing of suspended ceiling tiles has been reported to be associated with high humidity environments. ATC observed a slight musty odor in Courtroom B.

ATC inspected the area impacted by the February 2006 sewage backup event in the Probation and Parole area of the building. The BGS reported that in response to the sewage backup all the impacted areas were treated by removing the carpet and the damaged GWB up to one foot in height. ATC observed visual indications that this type of remediation was conducted.

General building cleanliness varied throughout the facility. The three story portion of the facility and the courthouse areas were generally observed to be typical of a well cleaned office building. The carpet in the Probation and Parole area in the 1978 portion of the building appeared to be in fair condition. Portions of this carpet were reported to be from original 1978 construction. Custodial cleaning in the Probation and Parole area was not as complete as in other areas of the building. ATC observed a stuffy odor in this portion of the building. The Probation and Parole area is reported to be occupied until 11 pm which causes this area to be occupied during the custodial cleaning schedule. This scheduling conflict is likely resulting in this area receiving less than adequate cleaning.

In the Department of Employment and Training area, Room 138 ATC observed peeling GWB seam tape around a window. This is indicative of water infiltration or high humidity in this area.

ATC observed a slight odor in the Department of Corrections area located in the first floor of the 1990 addition. This area is used as an alternative education center for High School aged

students. ATC also observed soiled camping equipment (e.g., sleeping bags, backpacks) and recently harvested garden vegetables (with associated soil) in this area. These materials were likely the source of the observed odor.

The scope of ATC's building walkthrough did not include a complete HVAC inspection. ATC did observe HVAC filters and coils and limited ductwork in several different areas of the facility. All of these items observed appeared clean and typical of well maintained buildings. Two areas of the building: Room 346 in the State's Attorneys office and Room 220 in the Department of Corrections area in the 1990 portion of the building were observed to have an abnormally high temperature. BGS was investigating the cause of this condition during the walkthrough.

ATC observed vegetative debris and some vegetative growth on the roof of the 1978 portion of the building. The boiler stack exhaust is located on this roof and is approximately 15 feet above this roof level. This boiler stack exhaust is upwind (assuming typical prevailing wind from the west) from the three story portion of the building where some of the outdoor air intakes are located.

### **3. MATERIALS AND METHODS**

The scope of testing and methods used for this investigation were developed in conjunction with the VDH. The VDH selected sample locations in part based on results of an occupant health survey it conducted and areas with reported Sarcoidosis cases.

#### **3.1 Temperature, Relative Humidity, Carbon Dioxide and Carbon Monoxide Sampling**

Carbon monoxide, carbon dioxide, temperature, and relative humidity were measured utilizing a TSI Q-Trak Model 8551 direct read instrument. These parameters were measured in various locations in the facility on August 23, 2006. In addition, these parameters were measured in ten locations over a 7 day period with one minute data recording intervals.

#### **3.2 Total Volatile Organic Sampling**

ATC measured levels of Total Volatile Organic Compounds (TVOCs) utilizing a direct reading meter for airborne TVOCs, a Rae Systems Photoionization Gas Detector Model MiniRAE 2000 equipped with a 10.6 eV UV lamp (serial #110-011805). This parameter was measured on August 23, 2006 and on August 31, 2006.

#### **3.3 Total Dust Sampling**

ATC measured levels of dust (0.1-10µm particle size) utilizing TSI Dust Trak Model 8520 direct reading instruments. This sampling was utilized as a screening tool for comparison with the VOSHA Total Dust standard. This parameter was measured in various locations in the facility on August 23, 2006. In addition, this parameter was measured in ten locations over a 7 day period with one minute data recording intervals.

### **3.4 Microbial Sampling**

ATC conducted carpet dust sampling via the vacuum filtration bag method with analysis for culturable fungi and endotoxins. The sampling method was supplied by the VDH and the results will be utilized by the VDH to compare with the occupant health survey data in order to determine if there are increased levels of fungi and endotoxins in complaint areas.

Fungi samples were cultured on Malt Extract Agar (MEA) at 25 degrees Centigrade for 7-10 days. Fungi results were reported in both colony forming units (CFU) per gram of dust collected and CFU per square meter sampled. Endotoxins were analyzed utilizing the response of Limulus Amebocyte Lysates (LAL) to endotoxin. Endotoxin results were reported in both endotoxins units (EU) per gram of dust collected and EU per square meter sampled. Endotoxin is produced by gram negative bacteria which are common in the environment.

### **3.5 Pesticide Sampling**

ATC collected wipe samples for the pesticide Permethrin utilizing a 35mm glass fiber filter moistened with Acetonitrile to wipe supply diffusers in various rooms recommended by the VDH. Permethrin samples were analyzed via High Performance Liquid Chromatography.

### **3.6 Metals Sampling**

ATC collected wipe samples for the metals Lead and Beryllium on supply diffusers in various rooms recommended by the VDH utilizing Ghost<sup>TM</sup> Wipes. Sampling methods were in general conformance with ASTM 1792-03 Standard Specification for Wipe Sampling Materials for Lead in Surface Dust. Lead and Beryllium samples were analyzed via Inductively Coupled Plasma (ICP) with a modified OSHA Method ID 125.

### **3.7 Air Flow Testing**

ATC conducted qualitative air flow testing to determine the pressurization as it pertains to air flow between room 104 and the boiler room of the facility due to occupant reports of exhaust odors. This test was conducted using visible smoke generated via a smoke tube.

## **4. INDOOR AIR QUALITY STANDARDS**

### **4.1 Vermont Occupational Safety and Health Administration (VOSHA)**

As far as airborne contaminants in the work place are concerned, the governing legal limits are set with the manufacturing environment in mind and are often set with regards to health implications and not comfort criteria. The Vermont Occupational Safety and Health Administration (VOSHA) has adopted Permissible Exposure Limits (PEL) for a variety of compounds, above which a potential health risk may exist in a work place.

#### 4.2 American Conference of Governmental Industrial Hygienists (ACGIH)

The American Conference of Governmental Industrial Hygienists (ACGIH) recommends Threshold Limit Values (TLV) for the work place. These are evaluated and if necessary are updated annually based on currently available toxicological and epidemiological data. These ACGIH guidelines are prepared based on a manufacturing environment and are not regulatory standards.

#### 4.3 American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)

The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) has published recommended limits for indoor air quality based on comfort and health criteria applicable to office environments.

#### 4.4 Specific Standards for Measured Parameters

##### TEMPERATURE AND RELATIVE HUMIDITY

Indoor temperature and relative humidity can be compared to the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 55-2004. ASHRAE standard 55-2004 (Thermal Environmental Conditions for Human Occupancy) generally defines methods for determining acceptable indoor temperature ranges based on the level of human occupant activity (i.e., metabolic rate), occupant clothing insulation, ambient humidity, and other factors. The intent of the standard is to provide acceptable thermal comfort for a desired percentage of building occupants. For typical office space as defined by the Standard, the following **Table 1** presents temperature ranges intended to provide acceptable thermal comfort for approximately 80% of the occupants.

<b>TABLE 1</b>		
Acceptable Temperature Ranges at Indicated Relative Humidity		
Typical Office Space Activity ASHRAE 55-2004		
<b>Relative Humidity</b>	<b>Temperature: Light Clothing</b>	<b>Temperature: Heavy Clothing</b>
10%	77-83°F	71-78°F
20%	76-82°F	70-78°F
30%	76-82°F	69-77°F
40%	76-81°F	69-77°F
50%	75-80°F	68-76°F
60%	75-78°F	68-75°F
70%	--	67-73°F

Standard 55-2004 does not provide recommendations for maintaining indoor relative humidity within a specific range but does establish an upper boundary for dew point at 62.2 degrees Fahrenheit, which occurs at approximately 65% relative humidity at 72 degrees Fahrenheit. ASHRAE Standard 62.1-2004 (see Carbon Dioxide discussion below) does establish a maximum relative humidity level of 65% where air-conditioning systems with dehumidification capability are installed.

It should be noted that ASHRAE Standard 55-2004 is only intended to provide acceptable thermal comfort for building occupants and is not intended to maintain conditions for preventing microbial growth. It should also be noted that no documented relative humidity value exists as a threshold that indicates the imminent growth of fungi (mold) on building materials and or surfaces. However, relative humidity levels directly correspond to dew point temperatures. Increasing relative humidity values, and therefore increasing dew point temperatures, may elevate the likelihood of surface condensation and subsequent potential microbial growth. Some building system components such as air conditioning ducts, cold water pipes, and concrete slabs on grade can be cooler than the maximum allowable dew point established by the Standard, resulting in condensation and potential microbial growth.

Temperature and relative humidity measurements as generally conducted for initial indoor air quality investigations are not intended to demonstrate compliance with all requirements of ASHRAE Standard 55-2004. The standard includes other requirements such as temperature variation and air speed within a space and defines specific protocols and procedure for evaluating compliance with the standard.

## CARBON DIOXIDE

Carbon dioxide monitoring is a useful screening technique (non-quantitative) for determining if outside air supply is sufficient for maintaining acceptable indoor air quality. Carbon dioxide is a naturally occurring constituent of the atmosphere and is also a product of human respiration. During periods of occupancy, carbon dioxide levels in a building will typically rise above normal background levels. The level of increase of carbon dioxide concentrations is generally related to the number of individuals in an area and the amount of outside air being introduced into that area.

Procedures for determining recommended outside air supply rates for occupied buildings are prescribed in the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 62.1-2004, *Ventilation for Acceptable Indoor Air Quality*. The purpose of this standard is to specify minimum ventilation rates and indoor air quality that will be acceptable to human occupants and are intended to minimize the potential for adverse health effects.

The ASHRAE Standard 62.1-2004 Ventilation Rate Procedure is a prescriptive procedure in which outdoor air intake rates are determined based on space type/application (e.g., general office, classroom, etc.), occupancy level, and floor area. The Ventilation Rate Procedure's minimum rates are based on contaminant sources and source strengths that are typical for the listed space types. For specific space types, the standard prescribes the amount of outside air supply required for the size of the area and the amount of outside air required for each person. These two outside air supply requirements are combined to determine the total outside air supply requirement for the occupied space. When the number of persons in an occupied space is not known, the standard defines default occupant density values that may be used for design purposes.

If one assumes that an occupied space remains at a steady state condition with respect to occupancy, level of occupant activity, and ventilation rate, then the carbon dioxide concentration within the occupied space will reach a theoretical equilibrium. The standard does not define a maximum carbon dioxide

concentration which would apply to all occupied spaces. Appendix C of ASHRAE Standard 62.1, which is an informative appendix and is not a requirement of the standard, suggests a minimum outside air supply rate of 15 cubic feet per minute (cfm) per person to dilute odors from human bioeffluents to levels that will satisfy a substantial majority of unadapted persons to a space. Calculations presented in Appendix C indicated that at this outside air supply rate, and assuming sedentary persons (e.g., office work), an equilibrium carbon dioxide concentration of 700 ppm above background levels would be achieved during steady state conditions. Similarly, a theoretical carbon dioxide equilibrium concentration can be determined for the required outside air supply rates for the various space types listed by the standard. The following **Table 2** presents default design outside air supply rates for some of the common space types listed by the standard. Theoretical equilibrium carbon dioxide concentrations above background levels, assuming steady state conditions and sedentary persons, are also presented.

<b>Table 2</b> <b>ASHRAE Standard 62.1-2004 Default Outside Air Supply Rates <sup>(1)</sup> and</b> <b>Theoretical Carbon Dioxide Concentrations at Steady State Conditions <sup>(2)</sup></b>			
Space Type	Default Occupant Density (Occupants per 1,000 SF)	Default Combined Outdoor Air Rate (cfm/person)	Approximate Equilibrium Carbon Dioxide Concentration Above Background
General Office	5	17	600 ppm
Telephone/Data Entry	60	6	1,700 ppm
Classroom (ages 5-8)	25	15	700 ppm
Classroom (ages 9 plus)	35	13	800 ppm
Lecture Classroom	65	8	1,300 ppm
Lecture Hall (fixed seats)	150	8	1,300 ppm
Auditorium Seating Area	150	5	2,060 ppm
Courtroom	70	6	1,700 ppm

(1) – Partial list. Refer to standard for complete list.

(2) – Assumes steady state conditions with sedentary persons.

The ventilation rates presented above include both an area-related component and an occupant-density-related component, which are added together to determine the required ventilation for the space. If actual occupant densities are known and vary from those indicated above, then expected equilibrium carbon dioxide concentrations would be adjusted accordingly.

Carbon dioxide monitoring as generally conducted for initial indoor air quality investigations is not intended to demonstrate compliance with ASHRAE Standard 62.1-2004. The standard does not specify a maximum carbon dioxide concentration. Actual conditions in an active occupied building will vary and equilibrium carbon dioxide concentrations generally would not be achieved. Other quantitative methods and/or engineering assessments are required to demonstrate compliance with the standard.

## CARBON MONOXIDE

Indoor carbon monoxide levels can be compared with the Vermont Occupational Safety and Health Administration (VOSHA) permissible exposure limit (PEL) of 35 ppm and the ACGIH TLV of 25 ppm.

## TOTAL DUST

Total airborne dust levels can be compared with the Vermont Occupational Safety and Health Administration (VOSHA) permissible exposure limit (PEL) of 15 mg/m<sup>3</sup>. The ACGIH TLV for inhalable particulate is 10 mg/m<sup>3</sup>.

## TOTAL VOLATILE ORGANIC COMPOUNDS

Currently, no regulatory agency (e.g. OSHA, EPA) has promulgated standards for this indoor air quality parameter in non-industrial buildings, such as offices and schools. For the real-time data collected, ATC has used the commonly accepted Target Guideline for TVOCs cited by the American Industrial Hygiene Association of 1 ppm (*Industrial Hygienists Guide to Indoor Air Quality Investigations* (1993), American Industrial Hygiene Association (AIHA)).

## 5. SAMPLING RESULTS

### 5.1 Grab Sampling for Temperature, Relative Humidity, Carbon Dioxide, Carbon Monoxide and VOCs

The following **Table 3** summarizes the sampling results collected on August 23, 2006 at various locations within the building.

<b>Table 3: Temperature, Relative Humidity, Carbon Dioxide, Carbon Monoxide, and VOC Sampling August 23, 2006</b>						
<b>BENNINGTON STATE OFFICE BUILDING- BENNINGTON, VERMONT</b>						
<i>Sampling Area</i>	<i>Time</i>	<i>Relative Humidity (%)</i>	<i>Temp (°F)</i>	<i>CO<sub>2</sub> (PPM)</i>	<i>CO (PPM)</i>	<i>TVOC (PPM)</i>
<b>Family Court</b>						
Northwest office behind court	12:45	44.7	81.6	673	ND	ND
Lobby	12:46	42.4	80.4	760	1	ND
Magistrates	12:47	42.7	81.5	790	1	ND
Family Court Room	12:49	35.9	77.9	640	1	ND
East File Room	12:52	41.4	80.1	841	1	0.1
Clerks Office	12:51	40.2	79.0	828	1	ND
Judges Chambers	12:54	42.7	80.1	723	1	ND
<b>Main Lobby</b>	13:52	51.3	75.9	526	ND	ND
<b>Social Welfare</b>						
Room 36	13:53	56.0	76.6	536	ND	ND
Room 35	13:54	55.8	76.9	563	ND	ND
Room 33	13:56	54.6	76.2	538	ND	ND
Room 46	13:58	52.6	76.9	552	ND	ND
Outside Room 44	14:00	52.6	77.0	603	1	ND

**Table 3: Temperature, Relative Humidity,  
Carbon Dioxide, Carbon Monoxide, and VOC Sampling  
August 23, 2006**

**BENNINGTON STATE OFFICE BUILDING- BENNINGTON, VERMONT**

<i>Sampling Area</i>	<i>Time</i>	<i>Relative Humidity (%)</i>	<i>Temp (°F)</i>	<i>CO<sub>2</sub> (PPM)</i>	<i>CO (PPM)</i>	<i>TVOC (PPM)</i>
Room 51	14:01	52.6	77.0	603	1	ND
Room 52	14:05	54.3	76.6	433	1	ND
Room 53	14:05	53.7	76.8	522	1	ND
Room 66	14:05	51.3	76.4	599	1	ND
Room 67	14:05	51.0	75.1	526	1	ND
Room 41	14:06	52.5	75.4	577	1	ND
<b>Probation and Parole</b>						
Room 100	14:12	58.4	76.6	490	1	ND
Room 92	14:13	58.1	76.9	527	1	ND
Room 90	14:15	56.6	76.5	459	1	ND
Room 87	14:16	57.6	76.8	599	1	ND
Room 84	14:16	57.3	77.0	480	1	ND
Outdoors Outside Entrance	14:21	53.8	79.1	344	1	ND
<b>Voc Rehab</b>						
Room 15	14:23	45.4	77.9	683	1	ND
Reception	14:23	43.3	79.3	580	1	ND
Room 16	14:24	45.8	76.7	583	1	ND
Room 21	14:26	48.5	77.2	585	1	ND
<b>Dept. of Corrections</b>						
Side Hall	14:31	49.9	79.3	547	1	ND
Reception	14:32	50.5	79.3	533	1	ND
Southeast corner	14:34	50.1	79.8	554	1	ND
<b>Dept. of Employment and Training</b>						
Center of cubicle space	14:36	47.3	79.8	553	1	ND
Cubicle on south wall	14:37	46.3	79.9	576	1	ND
Room 138	14:38	47.5	81.0	610	1	ND
Southwest offices	14:41	44.6	80.8	564	1	ND
<b>Family Service</b>						
Room 307	14:44	45.6	80.2	628	1	0.1
Room 312	14:52	47.5	79.6	614	1	0.2-0.3
Room 320	14:52	47.0	80.0	644	1	0.2
Room 327	14:53	44.4	76.5	623	1	0.1
Room 326	14:54	46.2	79.3	587	1	0.2
Room 335	14:55	47.6	79.4	614	1	0.2
Hall outside rooms 325 & 324	14:51	45.4	79.7	608	1	0.1
<b>States Attorney</b>						
Clerks Office	15:02	42.7	78.8	725	1	ND
Room 351	15:02	42.1	79.6	733	1	ND
Room 346	15:03	41.2	79.2	698	1	ND
Room 343	15:04	47.2	79.9	837	1	ND
<b>Child Support</b>						
Outside room 237	15:11	37.5	80.8	948	1	ND

**Table 3: Temperature, Relative Humidity,  
Carbon Dioxide, Carbon Monoxide, and VOC Sampling  
August 23, 2006**

**BENNINGTON STATE OFFICE BUILDING- BENNINGTON, VERMONT**

<i>Sampling Area</i>	<i>Time</i>	<i>Relative Humidity (%)</i>	<i>Temp (°F)</i>	<i>CO<sub>2</sub> (PPM)</i>	<i>CO (PPM)</i>	<i>TVOC (PPM)</i>
Hall- east end	15:16	40.7	81.7	885	1	ND
Room 236	15:17	41.7	81.8	960	1	ND
ISAP Room	15:22	46.4	82.3	614	1	0.2
<b>First Floor Maintenance</b>	15:35	37.1	80.5	531	1	ND
<b>District Court</b>						
Courtroom A	15:55	46.0	75.0	374	2	ND
Courtroom B	15:58	50.6	75.3	373	1	ND
Judges Chambers A	15:57	40.2	75.5	375	1	ND
Clerks Office	15:55	43.3	81.2	439	2	ND
Jury Room A	15:56	43.0	76.2	377	1	ND
Judges Chambers B	15:59	54.9	76.5	383	1	ND

ND=None Detected

Temperature levels measured during the grab sampling inside the facility were generally within the acceptable temperature ranges pursuant to the ASHRAE 55-2004 table for light clothing for 40% or 50% ambient relative humidity (the average indoor relative humidity was approximately 47.7%).

Relative humidity levels during the grab sampling within the facility were found to range between 35.8% and 58.4%. Outdoor relative humidity was measured at 53.8%. As stated above, the current ASHRAE Standard 55-2004 does not provide recommendations for maintaining indoor relative humidity within a specific range but does establish an upper boundary for dew point at 62.2°F. This upper threshold dew point occurs at varying combinations of temperature and relative humidity (e.g., approximately 65% relative humidity at an ambient temperature of 72°F). At the time of sampling, dew points within the facility did not exceed the ASHRAE upper boundary of 62.2°F. The average approximate dew point within the building was calculated to be 44.2°F.

Indoor CO<sub>2</sub> levels during the grab sampling ranged from a low of 373 ppm to a high of 960 ppm. Utilizing the ASHRAE equilibrium concentration for general office space in Table 2, the expected equilibrium CO<sub>2</sub> levels would be less than 600 ppm over ambient outdoor air concentrations. Ambient outdoor air was measured at 344 ppm, setting the ASHRAE equilibrium level at 944 ppm. Two grab sample readings, outside Room 237 and in Room 236 (both in the Child Support area) slightly exceeded the ASHRAE equilibrium level. None of the CO<sub>2</sub> readings exceeded the VOSHA standard or ACGIH levels within the facility for the grab sampling.

Indoor Carbon Monoxide levels during the grab sampling ranged from none detected (1 ppm detection limit) to 2 ppm. The VOSHA standard calls for CO exposure to be below 35 ppm. The

ACGIH TLV for CO is 25 ppm. None of the CO readings exceeded the VOSHA or the ACGIH levels during grab sampling.

While most to the TVOC readings were below the instruments limit of detection (0.1 ppm), several TVOC readings collected on August 23, 2006 were measured from 0.1 to 0.3 ppm. It should be noted that during sampling for TVOCs, ATC detected an odor that was identified as orange in nature upon entering the Family Services area of the building (the area with VOC measurements of 0.2-0.3 ppm). These types of odors are often associated with citrus based cleaning compounds. ATC observed this odor in the vicinity of a custodial cleaning bucket and TVOC measurements directly above this bucket reached 12 ppm. On August 31, 2006 ATC reexamined various areas that were measured to have a TVOC concentration at or above 0.2 ppm on August 23, 2006. When TVOCs were re-sampled on August 31, 2006 this odor was not detected. All of the TVOC levels measured on both dates were below the AIAH referenced level of 1 ppm. The following **Table 4** summarizes the sampling results collected on August 31, 2006:

<b>Table 4: TVOC Sampling</b> <b>August 31, 2006</b> <b>BENNINGTON STATE OFFICE BUILDING - BENNINGTON,</b> <b>VERMONT</b>		
<i>Sampling Area</i>	<i>Time</i>	<i>TVOC (PPM)</i>
<b>Family Services</b>		
Room 307	08:35	ND
Room 312	08:36	ND
Room 320	08:36	ND
Room 327	08:37	ND
Room 327	08:39	ND
Room 335	08:39	ND
Hallway outside 325 & 324	08:39	ND
<b>States Attorney</b>		
ISAP Room	08:40	0.1-0.2

ND = None Detected

## 5.2 Grab Sampling for Total Dust

Grab Sampling for Total Dust is presented in the following **Table 5**.

<b>Table 5: Total Dust Sampling</b> <b>August 23, 2006</b> <b>BENNINGTON STATE OFFICE BUILDING-</b> <b>BENNINGTON, VT</b>		
<i>Sampling Area</i>	<i>Time</i>	<i>Total Dust (mg/m<sup>3</sup>)</i>
<b>Family Court</b>		
Northwest office Behind court	12:45	0.028
Lobby	12:46	0.008
Magistrates	12:47	0.013
Family Court Room	12:49	0.010
East File Room	12:52	0.009
Clerks Office	12:51	0.014
Judges Chambers	12:54	0.020
<b>Main Lobby</b>	13:52	0.026
<b>Social Welfare</b>		
Room 36	13:53	0.034
Room 35	13:54	0.033
Room 33	13:56	0.014
Room 46	13:58	0.015
Outside Room 44	14:00	0.014
Room 51	14:01	0.022
Room 52	14:05	0.013
Room 53	14:05	0.014
Room 66	14:05	0.012
Room 67	14:05	0.014
Room 41	14:06	0.015
<b>Probation and Parole</b>		
Room 100	14:12	0.015
Room 92	14:13	0.020
Room 90	14:15	0.016
Room 87	14:16	0.023
Room 84	14:16	0.013
Outdoors Outside Entrance	14:21	0.013
<b>Voc Rehab</b>		
Room 15	14:23	0.013
Reception	14:23	0.011
Room 16	14:24	0.010
Room 21	14:26	0.009
<b>Dept. of Corrections</b>		
Side Hall	14:31	0.009
Reception	14:32	0.016
Southeast corner	14:34	0.013

<b>Dept. of Employment and Training</b>		
Center of cubicle space	14:36	0.007
Cubicle on south wall	14:37	0.013
Room 138	14:38	0.007
Southwest offices	14:41	0.006
<b>Family Service</b>		
Room 307	14:44	0.009
Room 312	14:52	0.006
Room 320	14:52	0.012
Room 327	14:53	0.011
Room 326	14:54	0.008
Room 335	14:55	0.009
Hall outside rooms 325 & 324	14:51	0.012
<b>States Attorney</b>		
Clerks Office	15:02	0.009
Room 351	15:02	0.009
Room 346	15:03	0.005
Room 343	15:04	0.014
<b>Child Support</b>		
Outside room 237	15:11	0.016
Hall- east end	15:16	0.018
Room 236	15:17	0.013
ISAP Room	15:22	0.009
<b>First Floor Maintenance</b>	15:35	0.014
<b>District Court</b>		
Courtroom A	15:55	0.007
Courtroom B	15:58	0.006
Judges Chambers A	15:57	0.011
Clerks Office	15:55	0.010
Jury Room A	15:56	0.007
Judges Chambers B	15:59	0.013

Indoor total dust levels measured during the grab sampling ranged from a low of 0.005 mg/m<sup>3</sup> to a high of 0.034 mg/m<sup>3</sup>. The average indoor total dust level was 0.013 mg/m<sup>3</sup>. All indoor total dust readings were below the VOSHA PEL of 15 mg/m<sup>3</sup> and the ACGIH TLV of 10 mg/m<sup>3</sup>. Outdoor air was measured at 0.013 mg/m<sup>3</sup>. Indoor total dust levels measured during the grab sampling were at levels which ATC typically observes in office buildings.

### 5.3 7-day Data log sampling for Temperature, Relative Humidity, Carbon Dioxide, and Carbon Monoxide Results

Data log sampling was conducted in 10 locations through out the building in areas determined by the Vermont State Health Department. Due to equipment failure sampling was conducted over three time periods: August 21 through September 1, September 9 through September 16 and

finally September 15 through September 23, 2006. **Appendix B** of this report contains graphical representations of the IAQ data collected during the seven day monitoring.

Testing results for 7-day sampling for Temperature, Relative Humidity, Carbon Dioxide, and Carbon Monoxide within the facility are presented in the following **Table 6**:

<b>Table 6: Temperature, Relative Humidity, Carbon Dioxide, and Carbon Monoxide</b>												
<b>7-Day Data</b>												
<b>BENNINGTON STATE OFFICE BUILDING- BENNINGTON, VERMONT</b>												
Location	CO (ppm)			CO2 (ppm)			Temp (° F)			RH (%)		
	High	Low	Ave	High	Low	Ave	High	Low	Ave	High	Low	Ave
Probation and Parole	ND	ND	ND	759	321	383	72.5	69.0	70.6	65.6	42.9	55.4
Vocational Rehabilitation	ND	ND	ND	581	256	384	70.7	64.1	67.5	79.5	51.2	65.9
Economic Services	ND	ND	ND	680	427	489	74.1	69.1	71.1	63.2	39.2	53.1
Department of Corrections	1	ND	ND	689	375	433	75.7	67.6	73.3	68.6	31.3	44.3
Department of Labor	2	1	2	662	353	404	80.9	78.7	79.9	52.4	34.6	45.1
District Court	1	ND	ND	680	359	412	74.0	66.9	71.9	69.6	30.7	47.0
Family Services	ND	ND	ND	1009	413	488	82.6	74.8	78.8	63.7	42.3	50.8
State's Attorney	1	ND	1	941	380	494	82.0	70.3	74.9	61.1	33.3	45.4
Family Court	1	ND	ND	994	376	481	82.8	78.0	80.5	46.9	32.4	39.1
Child Support	ND	ND	ND	917	455	551	82.5	73.7	77.4	52.3	32.3	40.4

Average relative humidity levels varied between 39.1 % and 65.9 % in different areas of the building. The lowest average relative humidity levels were in Family Court and Child Support which were both located in the second floor of the facility. The three areas with the highest relative humidity levels (Vocational Rehabilitation, Probation and Parole and Economic Services) were located in the first floor original construction portion of the facility. The Vocational Rehabilitation area's average relative humidity level was 65.9 % which is greater than the ASHRAE reference level for spaces with air conditioning systems and dehumidification capabilities. BGS reported to ATC that there has been operational problems with the dehumidification system in this area.

Average temperature levels measured during the 7-day sampling inside the facility were generally within or below the acceptable temperature ranges pursuant to the ASHRAE 55-2004 table for light clothing for 40% to 60% ambient relative humidity.

ATC calculated dew points for the average temperature and average relative humidity in each area which are listed below in **Table 7**. The average dew points ranged from below 35 °F to 54 °F. Based on the average temperature and average relative humidity in each area during the 7-day sampling, dew points within the facility did not exceed the ASHRAE upper boundary of 62.2°F.

<b>Table 7</b> <b>7 day Averages for Temperature, Relative Humidity</b> <b>and Dew Point</b>  <b>BENNINGTON STATE OFFICE BUILDING-</b> <b>BENNINGTON, VERMONT</b>			
<b>Location</b>	<b>Ave. RH (%)</b>	<b>Ave. Temp (° F)</b>	<b>Dew Point (° F)</b>
Probation and Parole	42.9	70.6	35
Vocational Rehabilitation	65.9	67.5	54
Economic Services	53.2	71.1	42
Department of Corrections	44.3	73.3	33
Department of Labor	45.1	79.9	39
District Court	47	71.9	37
Family Services	50.8	78.8	43
State's Attorney	33.3	74.9	below 35
Family Court	39.1	80.5	34
Child Support	40.8	77.4	33

The highest indoor CO<sub>2</sub> levels measured during the 7-day sampling period ranged from 581 ppm to 1009 ppm. The peak reading of 1009 ppm was recorded in the Family Services area for a single (one minute) reading during the equipment set up. This reading was affected by the ATC personnel setting up the instrument and should be disregarded. The actual 7-day peak reading in this area was 814 ppm. Utilizing the ASHRAE equilibrium concentration for general office space in Table 2, the expected equilibrium CO<sub>2</sub> level would be less than 600 ppm ( less than 1,700 ppm for courtrooms) over ambient outdoor air concentrations. Ambient outdoor air levels are typically around 350 ppm, setting the ASHRAE equilibrium level at 950 ppm (2,050 ppm for courtrooms). Measured CO<sub>2</sub> levels did not indicate significant variations from the applicable ASHRAE equilibrium levels at the time of sampling. None of the CO<sub>2</sub> readings exceeded the VOSHA or ACGIH levels within the facility during the 7-day sampling.

Indoor Carbon Monoxide levels during the grab sampling ranged from none detected (1 ppm detection limit) to 2 ppm. The VOSHA standard calls for CO exposure to be below 35 ppm. The ACGIH TLV for CO is 25 ppm. None of the CO readings exceeded the VOSHA or the ACGIH levels during the 7-day sampling.

#### 5.4 7-day Data log sampling for Total Dust

7-day data log sampling was conducted in 10 locations through out the building in areas determined by the Vermont State Health Department. Due to equipment failure sampling was conducted on two occasions, August 21 through September 1, and September 9 through September 16. **Appendix B** of this report contains graphical representations of the Total Dust data collected during the 7-day monitoring.

Testing results for the 7-day log sampling for Total Dust within the facility are presented in the following **Table 8**:

<b>Table 8: Total Dust – 7 day Sampling Data</b>			
<b>BENNINGTON STATE OFFICE BUILDING- BENNINGTON, VERMONT</b>			
<b>Location</b>	<b>Total Dust (mg/m<sup>3</sup>)</b>		
	High	Low	Ave
Probation and Parole	0.083	0.001	0.009
Vocational Rehabilitation	0.122	0.001	0.024
Economic Services	0.106	0.002	0.010
Department of Corrections	1.012	ND	0.004
Department of Labor	0.044	ND	0.006
District Court	0.104	0.002	0.018
Family Services	0.174	0.002	0.009
State's Attorney	0.429	ND	0.009
Family Court	0.166	0.001	0.007
Child Support	0.086	ND	0.006

Indoor average total dust levels measured during the 7-day sampling ranged from a low of 0.004 mg/m<sup>3</sup> to a high of 0.024 mg/m<sup>3</sup>. All indoor total dust readings were below the VOSHA PEL of 15 mg/m<sup>3</sup> and the ACGIH TLV of 10 mg/m<sup>3</sup>. The average indoor total dust levels measured in each area during the 7-day sampling were at levels which ATC typically observes in office buildings. ATC typically observes total dust levels in office buildings to be below 0.10 mg/m<sup>3</sup>. ATC reviewed the total dust data in order to determine the duration of the peak total dust measurements in each area with readings above 0.10 mg/m<sup>3</sup>. The only area with sustained readings (longer than two minutes) above 0.10 mg/m<sup>3</sup> was the Vocational Rehabilitation area which had readings between approximately 0.03 mg/m<sup>3</sup> and 0.12 mg/m<sup>3</sup> from the afternoon of August 28, 2006 to the afternoon of August 31, 2006.

## 5.5 Microbial Sampling:

Microbial vacuum dust sampling results for fungi and endotoxins within the facility are presented in the following **Table 9**:

<b>Table 9: Fungal and Endotoxin Concentration from Vacuum Sampling</b>		
<b>August 23, 2006</b>		
<b>Bennington State Office Building</b>		
<b>Bennington, Vermont</b>		
<b>Sample #/Location</b>	<b>Fungal Concentration (CFU/g)</b>	<b>Endotoxin Concentration (EU/g)</b>
VAC-01 / District Court (Clerks Office btwn Courtrooms)	27,200	130,000
VAC-02 / Probation and Parole (Hallway 75 outside rooms 79 and 77)	34,700	42,000
VAC-03 / Probation and Parole (Northeast corner of hallway 95)	30,100	23,000
VAC-04 / Vocational Rehabilitation (Room 14)	1,770	16,000
VAC-05 / Economic Services (Room 35)	8,780	13,000
VAC-06 / Economic Services (Hallway 56 outside room 57)	19,300	26,000
VAC-07 / Department of Corrections (Hallway 123 outside room 121)	580,000	44,000
VAC-08 / Department of Labor (Room 143)	16,700	34,000
VAC-09 / Child Support (Hallway outside rooms 237 and 238)	26,400	55,000
VAC-10 / State's Attorney (Room 356)	22,900	21,000
VAC-11 / Family Services (Hallway outside room 324)	28,300	38,000
VAC-12 / Family Court (Center of Room 210)	18,400	21,000

Fungi concentrations in dust or bulk samples can be evaluated utilizing the categories presented by P&K Microbiological Services (P&K), Cherry Hill, NJ. P&K presents the following five categories:

Category	CFU/g
Very High	> 10,000,000
High	1,000,000 to 10,000,000
Moderate	100,000 to <1,000,000
Low Moderate	5,000 to < 100,000
Low	< 5,000

Based on the P&K categories, all the sample results, except for sample VAC-07 - Department of Corrections, would be in the Low or Low Moderate category. The results for sample VAC-07 - Department of Corrections would be in the Moderate category. It should be noted that ATC observed soiled camping equipment (e.g., sleeping bags, backpacks) and recently harvested garden vegetables (with associated soil) in this area.

The following fungal types were consistently predominant in the carpet dust samples: *Pithomyces chartarum*, *Cladosporium*, *Rhodotorula glutinis*, and *Epicoccum nigrum*. These fungal types are common outdoor fungi and are associated with allergenic activity.

Comparative levels of endotoxins in dust have been reported in the publication *Bioaerosols Assessment and Control*, American Conference of Governmental Industrial Hygienists, 2001. This publication refers to an endotoxin level of 1.1 ng/mg as being a median level found in house dust and exposures above this level being associated with increased asthma severity in adults. One ng of endotoxins can be approximated to equal 10 to 15 endotoxin units (EU). Therefore, this 1.1 ng/mg level would convert to 11 EU/ mg (11,000 EU/g) to 16.5 EU/mg (16,500 EU/g). All of the sample results for endotoxins in carpet dust from the facility exceeded 11,000 EU/g with the lowest level being 16,000 EU/g.

It is important to note that regulatory standards are not available for levels of fungi and endotoxins. ATC understands that the VDH will be further analyzing the fungi and endotoxin data.

Laboratory hardcopy results of the microbial vacuum sampling for Fungi and Endotoxins can be found in **Appendix C**.

## 5.6 Microbial Bulk Sampling:

Bulk sampling results for visible suspected microbial growth are presented in the following **Table 10:**

<b>Table 10: Microbial Bulk Sampling</b>			
<b>AUGUST 23, 2006</b>			
<b>Bennington State Office Building – Bennington, Vermont</b>			
<b>Sample Number</b>	<b>Fungal ID</b>	<b>Fungal Concentration (CFU/g)</b>	<b>Endotoxin Concentration (EU/g)</b>
FB-01 / Ceiling Tile Room 343	<i>Utociadium botrytis</i>	1,650,000	8,500
FB-02 / Ceiling Tile in hallway outside Room 121	<i>Aternaria alternata</i>	13,100	950

Using the P&K categories for bulk sample concentrations, Sample FB-01 contained high levels of fungal growth and sample FB-02 contained low moderate levels of fungal growth.

Laboratory hardcopy results for microbial bulk sampling can be found in **Appendix D.**

## 5.7 Metals in Dust Wipe Testing

Metal Wipe Testing results for Lead and Beryllium are presented in the following **Table 11:**

**Table 11: Metal in Dust Wipe Sampling****AUGUST 23, 2006****State Office Building  
Bennington, Vermont**

<b>Sample Number</b>	<b>Wipe Area (ft<sup>2</sup>)</b>	<b>Component</b>	<b>Results (ug)</b>	<b>Result (ug/ft<sup>2</sup>)</b>
MW-01 (field blank)	N/A	Lead	< 0.750	N/A
		Beryllium	< 0.0150	N/A
MW-02 / Room 90	1.00	Lead	16.8	17
		Beryllium	< 0.0150	< 0.015
MW-03 / Room 46	1.00	Lead	5.40	5.4
		Beryllium	< 0.0150	<0.015
MW-04 / Room 16	1.00	Lead	4.24	4.2
		Beryllium	< 0.0150	< 0.015
MW-05 / Room 210	0.630	Lead	39.0	62
		Beryllium	< 0.0150	< 0.024
MW-06 / Room 237	0.440	Lead	16.7	38
		Beryllium	< 0.0150	< 0.034
MW-07 / Room 356	0.500	Lead	19.7	39
		Beryllium	< 0.0150	< 0.030

None of the Beryllium samples exceeded the reporting limit of 0.0150ug. Results for Lead ranged from a low of 4.2 ug/ft<sup>2</sup> to a high of 62 ug/ft<sup>2</sup>. While regulatory standards are not available to directly evaluate these results, the lead in dust levels can be compared to the US Department of Housing and Urban Development (HUD)/US EPA levels for lead in dust following lead abatement activities. The HUD/EPA levels are as follows: < 40 ug/ft<sup>2</sup> on floor surfaces, < 250 ug/ ft<sup>2</sup> for window sills, and < 400 ug/ ft<sup>2</sup> for window wells. One sample (MW-05) exceeded the HUD/EPA level for floor surfaces. In general, the results from the second and third floor of the 1990 addition were higher than the other sample results. Laboratory hardcopy results for metals in dust wipe sampling can be found in **Appendix E**.

**5.8 Pesticide Wipe Testing**

Pesticide Wipe Testing results for presence of Permethrin are presented in the following **Table 12**:

**TABLE 12: PESTICIDE IN DUST WIPE SAMPLING**

**AUGUST 23, 2006**

**Bennington State Office Building -  
Bennington, Vermont**

<b>Sample Number</b>	<b>Wipe Area (ft<sup>2</sup>)</b>	<b>Component</b>	<b>Results (ug)</b>	<b>Result (ug/ft<sup>2</sup>)</b>
PW-01 (field blank)	N/A	Permethrin	< 1.50	<14
PW-02 / Room 90	0.108	Permethrin	< 1.50	<14
PW-03 / Room 46	0.108	Permethrin	< 1.50	<14
PW-04 / Room 16	0.108	Permethrin	< 1.50	<14
PW-05 / Room 210	0.0860	Permethrin	2.59	30
PW-06 / Room 237	0.0860	Permethrin	< 1.50	<14
PW-07 / Room 356	0.0860	Permethrin	< 1.50	<14

Only one sample collected (PW-05 taken in room 210 in the Family Court Area) exceeded the reporting limit of 1.50ug. Permethrin results are to be evaluated by VDH. Laboratory hardcopy results for Pesticides in Dust Wipe sampling can be found in **Appendix E**.

## **5.9 Air Flow Testing**

On September 15, 2006 ATC conducted qualitative air flow testing to determine the pressurization as it pertains to air flow between room 104 and the boiler room of the facility due to occupant reports of exhaust odors. This test was conducted using a visible smoke generated via a smoke tube.

ATC observed two metal ducts running through the wall between the cavity above a drop ceiling in room 104 and the boiler room. The openings between these metal ducts and the surrounding GWB had been partially filled using an expandable spray foam; however, this foam was observed to be insufficient in stopping air flow between the two areas, or into the wall cavity. ATC observed a noticeable air flow originating in room 104 and entering the wall cavity. This air flow direction was confirmed with the use of a smoke tube. Room 104 was determined to be under positive pressure with respect to the boiler room.

An additional test was conducted at the request of building maintenance personnel who had identified what they considered improperly sealed joints on a air duct located behind the furnace unit in the boiler room. When the area of concern was tested, ATC observed infiltration into the air duct from the boiler room. This smoke was subsequently identified to be present in room 104.

## 6. CONCLUSIONS

- Visual observations confirmed the presence of numerous water stained ceiling tiles which reportedly were the result of leaking valves, leaking sprinkler lines and roof leaks. Wide spread water damaged GWB and visually apparent microbial growth was not observed.
- General building cleanliness was variable throughout the facility. While the majority of the building exhibited typical office building custodial cleaning, the Probation and Parole area showed less than adequate cleaning.
- Temperature and relative humidity levels within the facility were in general conformance with applicable ASHRAE recommended ranges at the time of sampling as were the calculated average dew points. 7 day relative humidity measurements indicated that the first floor original construction portion of the facility had higher relative humidity levels as compared to the other measured areas. The Vocational Rehabilitation area's 7-day average relative humidity level was 65.9 % which is greater than the ASHRAE reference level for spaces with air conditioning systems and dehumidification capabilities.
- Carbon dioxide levels within the facility did not indicate significant variations from the applicable ASHRAE equilibrium levels at the time of sampling. Measured carbon dioxide levels indoors did not exceed the VOSHA PEL or the ACGIH TLV.
- Measured carbon monoxide dioxide levels indoors did not exceed the VOSHA PEL or the ACGIH TLV.
- Low, but detectable levels of Total Volatile Organic Compounds were identified with the Photo Ionization Detector at the time of sampling. The detectable levels were primarily associated with citrus based cleaning products.
- Total dust levels were below the applicable VOSHA PEL and ACGIH TLV at the time of sampling. Based on ATC's experience, dust levels were typical of an office environment with the exception of three days of readings in the Vocational Rehabilitation area.
- Microbial carpet dust sampling primarily indicated low to low moderate levels of culturable fungi. The result for sample VAC-07 from the Department of Corrections indicated moderate levels of fungi. Soil from camping equipment and gardening debris may have contributed to the higher levels measured in the Department of Corrections.
- Microbial carpet dust sampling indicated that endotoxins levels were higher than reported median levels found in house dust.
- Microbial bulk sampling of ceiling tiles confirmed that the visually apparent microbial growth was culturable fungi and endotoxins from bacteria were present.
- Metals in dust sampling did not detect beryllium in the sampled locations. Lead was detected on each of the air supply diffusers sampled, one sample result indicated levels above HUD/EPA post abatement levels for floor surfaces.
- Permethrin was detected in one sample from an air supply diffuser in Room 210.
- Qualitative air flow testing indicated that air flow connections exist between the boiler room and surrounding areas.

## 7. RECOMMENDATIONS

- A ventilation system operations/maintenance log and building occupant diary should be maintained to further evaluate HVAC operations and spatial patterns to occupant symptoms.
- An aggressive plan should be implemented to identify and repair all sources of uncontrolled water leaks and infiltration in the building. This plan should include valves, piping and roof leaks. As leaks are fixed, water damaged ceiling tiles should be replaced. Precautionary measures should be used when replacing ceiling tiles in order to minimize potential airborne fungi and bacteria releases. These measures should include lightly misting tiles and placing them directly into disposal bags followed by wet wiping the ceiling grid area with a mild detergent. The source of the water infiltration in the vicinity of the window in Room 138 should be identified and repaired.
- An evaluation of custodial activities and schedules should be conducted with a goal of increasing overall building cleanliness, particularly in problem areas.
- The general IAQ sampling results (CO, CO<sub>2</sub>, temperature, relative humidity and dust) should be evaluated by a mechanical engineer in order to help determine the effectiveness of the building's HVAC system. The mechanical engineer should perform a complete existing conditions review of the building's HVAC system.
- The building's poured concrete slab should be evaluated to determine if water vapor infiltration through the slab is influencing indoor relative humidity in the building.
- Carpets should be evaluated by a knowledgeable floor covering professional and worn areas should be considered for replacement. If carpet removal is conducted, it should be conducted in a controlled manner with precautionary measures to minimize dust generation.
- Pesticide control procedures for the facility should be evaluated to determine if Permethrin is currently being used outside the facility. Pest control practices should be implemented which minimize pesticide use and prevent exterior pesticides from entering the building.
- Wall penetrations from the boiler room to the surrounding areas should be thoroughly fire-stopped. Air ducts passing through the boiler room should be sealed.
- This report should be forwarded to the VDH to assist them with their investigation of the building.

## **LIMITATIONS**

This report has been prepared to assist the Department of Buildings and General Services in evaluating the indoor air quality of the State Office Building located at 1 Veterans Memorial Way in Bennington, Vermont. ATC provided these services consistent with the level and skill ordinarily exercised by members of the profession currently practicing under similar conditions. This statement is in lieu of other statements either expressed or implied. This report is intended for the sole use of the Department of Building Services. The intent of the report is to aid the building owner in locating potential IAQ impacts. This report is not intended to serve as a bidding document nor as a project specification document and actual site conditions and quantities should be field-verified. Although a reasonable attempt has been made to identify suspect fungi (mold) in the areas identified, the inspection techniques used are inherently limited in the sense that only full demolition procedures will reveal all building materials of a structure and therefore all areas of potential fungal growth. The size of the area impacted by fungal impact is based on professional judgment and practicality. Additionally, other possible building material hazards such as asbestos and lead-based paint were not included as part of this evaluation and may require proper sampling for identification prior to disturbance. Other unidentified microbiological impact may be located within walls, ceiling cavities, below flooring or grade, and other non-accessible areas. Precaution should be used during any remediation activities. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document, the findings, conclusions, or recommendations is at the risk of said user.

Additionally, the passage of time may result in a change in the environmental characteristics at this site. This report does not warrant against future operations or conditions that could affect the recommendations made. The results, findings, conclusions, and recommendations expressed in this report are based only on conditions that were observed during ATC's inspection of the site.

## **APPENDIX A**

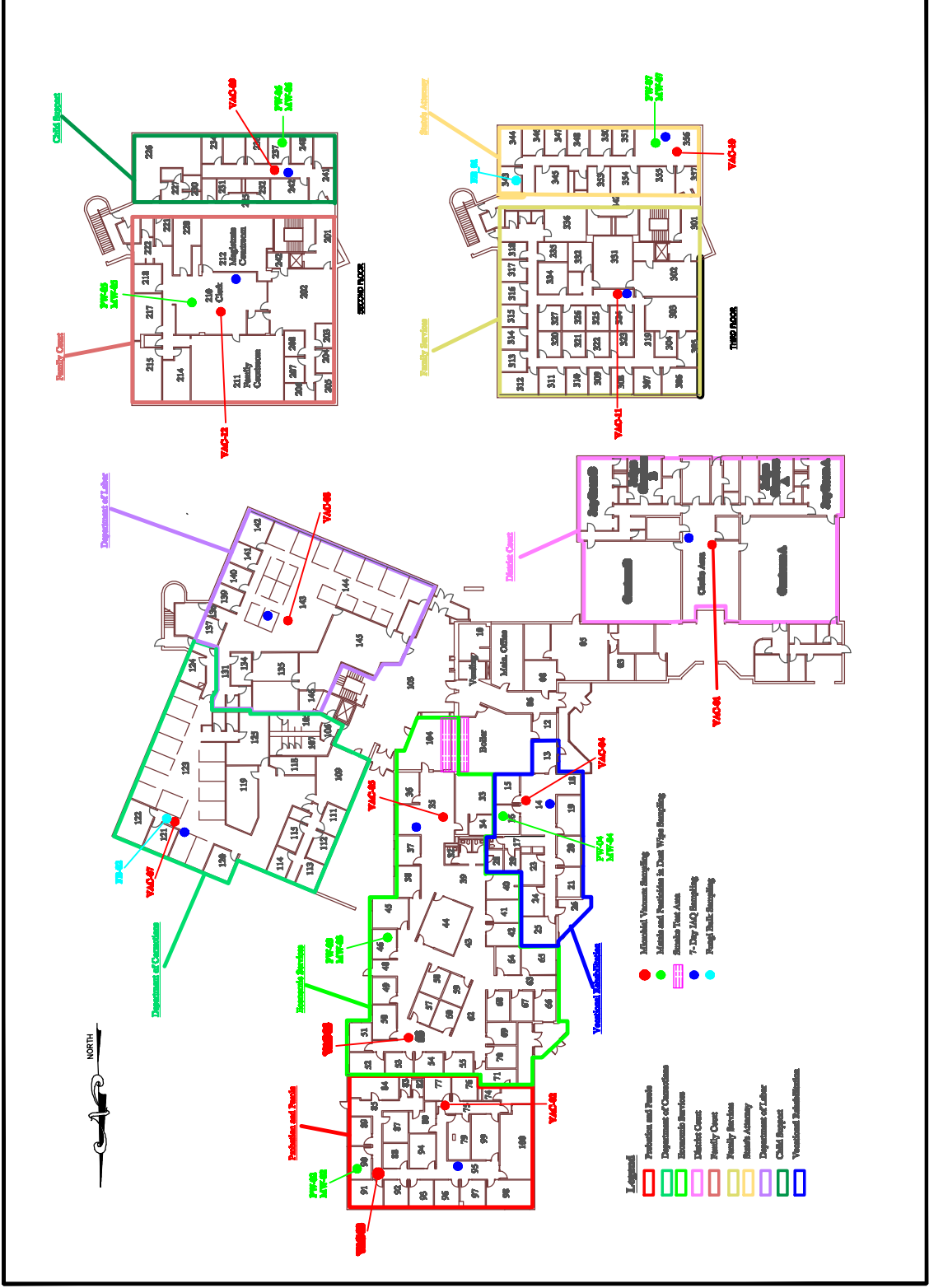
### **DIAGRAMS**

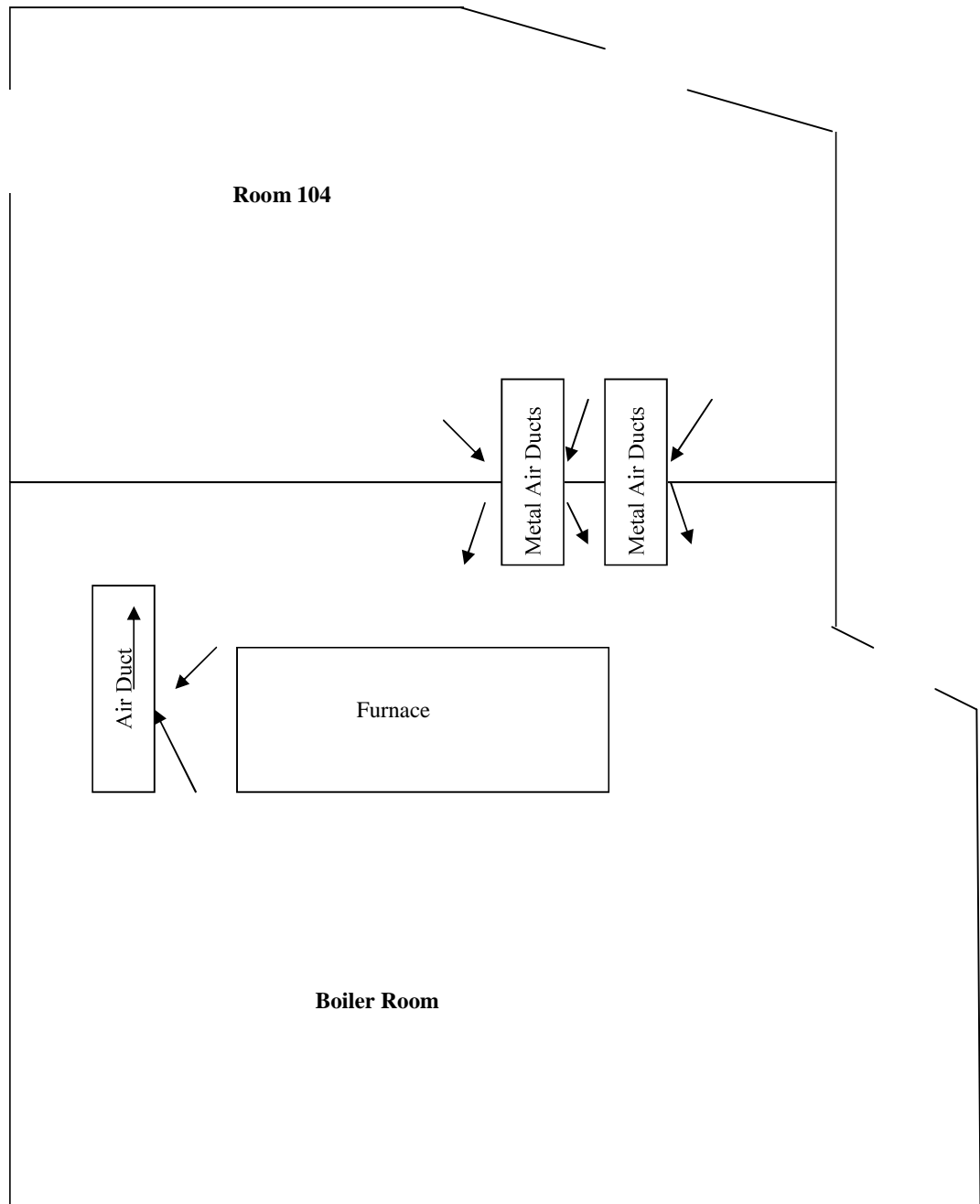


FIGURE

# Sample Location Diagram Bennington State Office Building Bennington, Vermont October - 2006

PROJECT NUMBER	63-03006-0005	SECTION	UTB
DATE	10-08-2006	DATE	10-08-2006
BY	TS	BY	TS
SCALE	1/8" = 1'-0"	SCALE	1/8" = 1'-0"





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Phone (802) 434-2113  
Fax (802) 434-2160

**ATC Project #: 63.03505.0035**  
  
**Project Location:**  
Bennington State Office Building  
1 Veterans Memorial Drive  
Bennington, Vermont

**Drawn by: JS**  
**Sampled by: JS**  
**Checked by: TB**  
*Diagram not to scale*  
  
**Date: October 2006**

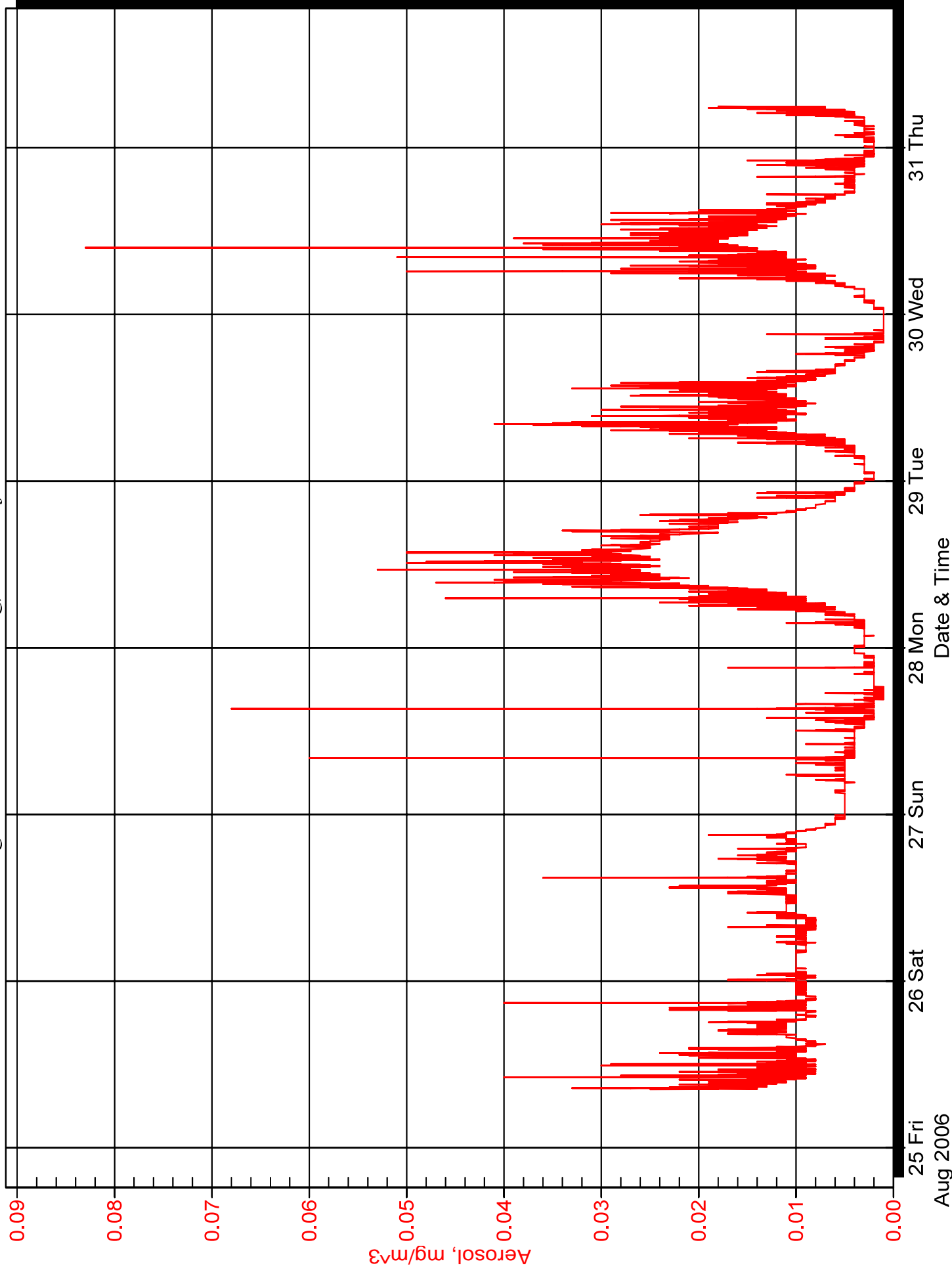
**FIGURE 2**  
  
**Smoke Test  
Location  
Diagram**

## **APPENDIX B**

### **7 DAY MONITORING RESULTS**

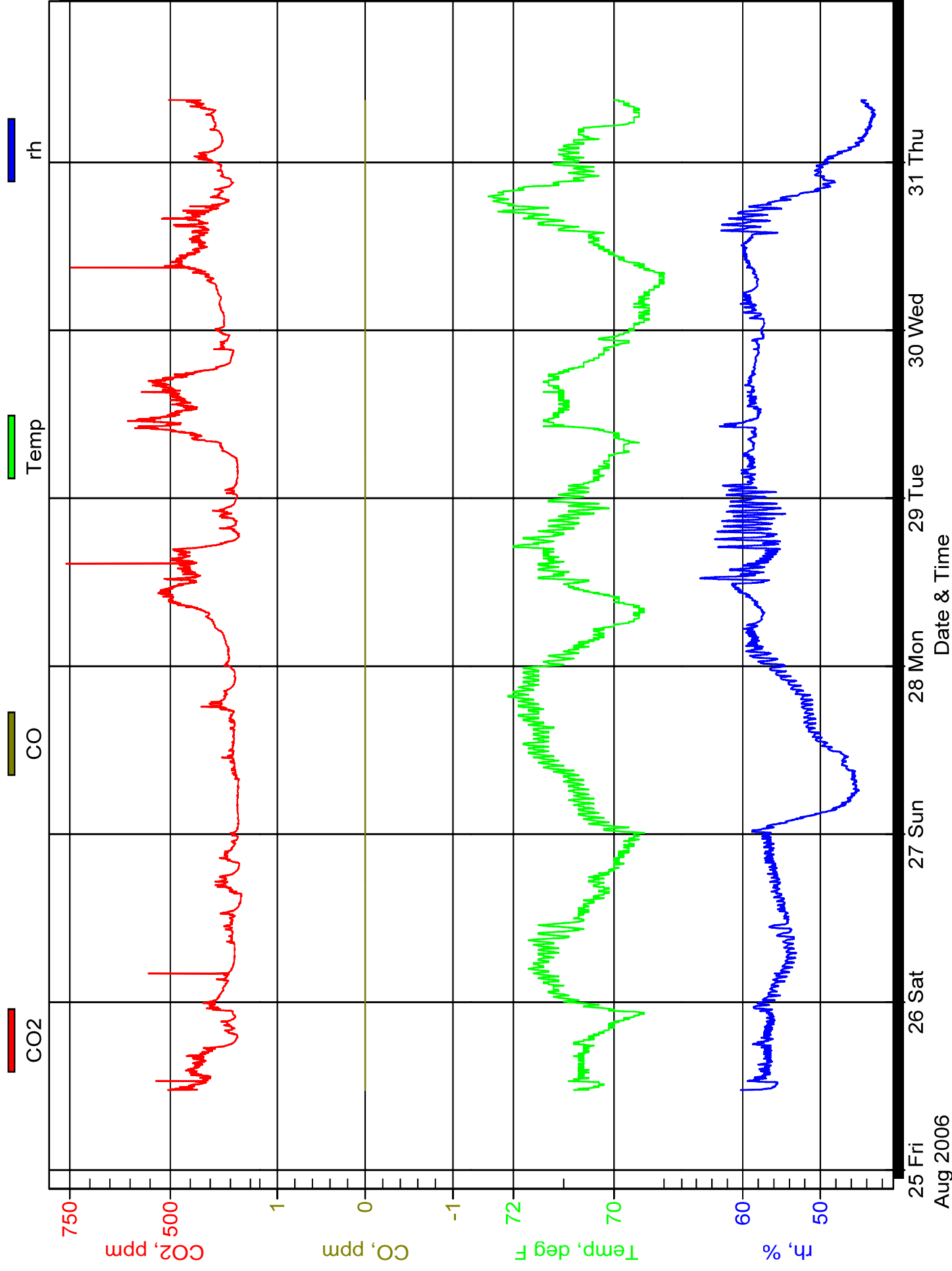
# Probation and Parole - Hall Between Rooms 96 and 79

Bennington State Office Building, ATC Project # 63.03505.0035



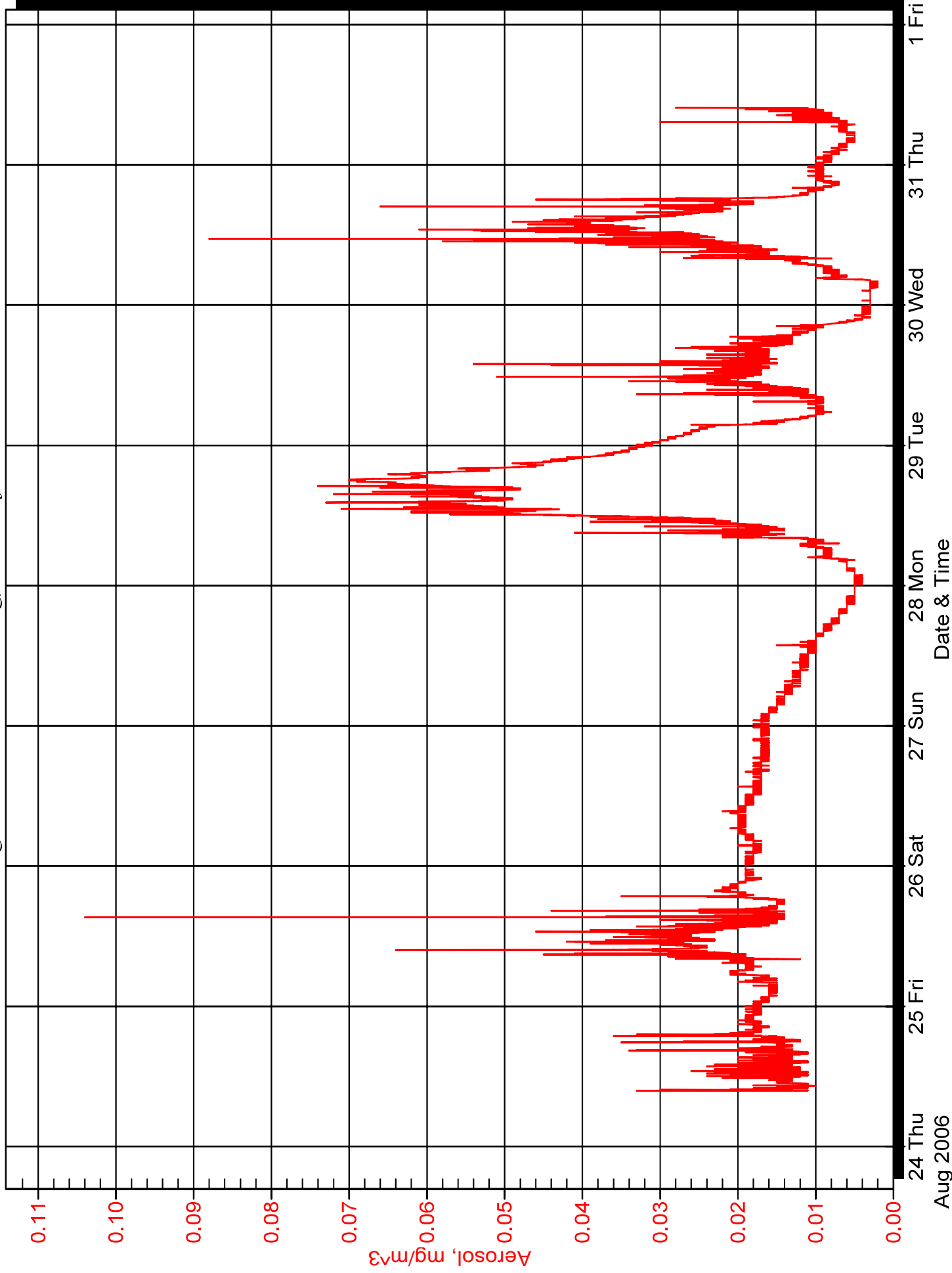
# Probation and Parole - Hall Between Rooms 96 and 79

Bennington State Office Building, ATC Project #63.03505.0035



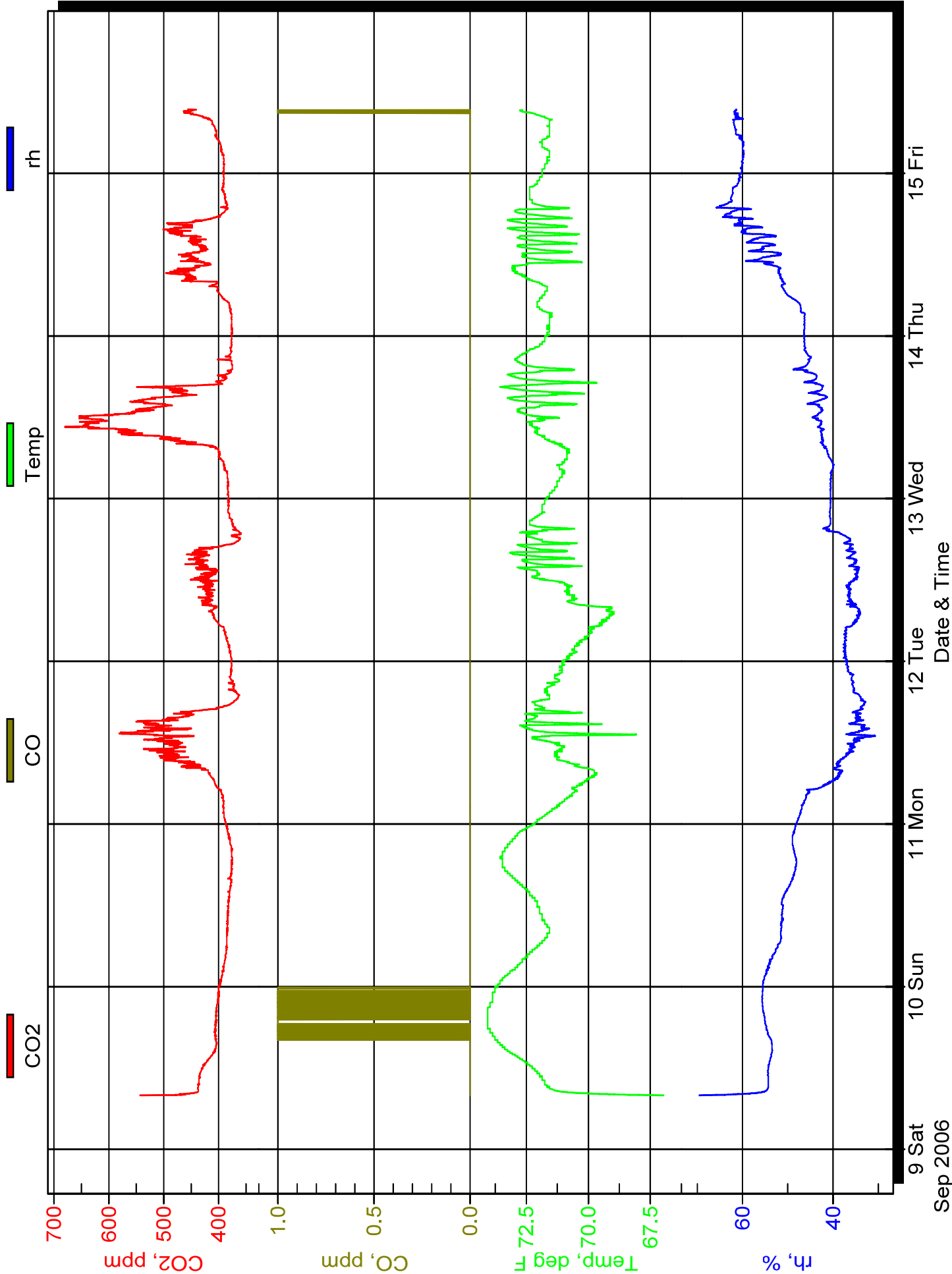
# District Court - Clerks Area Between Courtrooms A & B

Bennington State Office Building, ATC Project #63.03505.0035



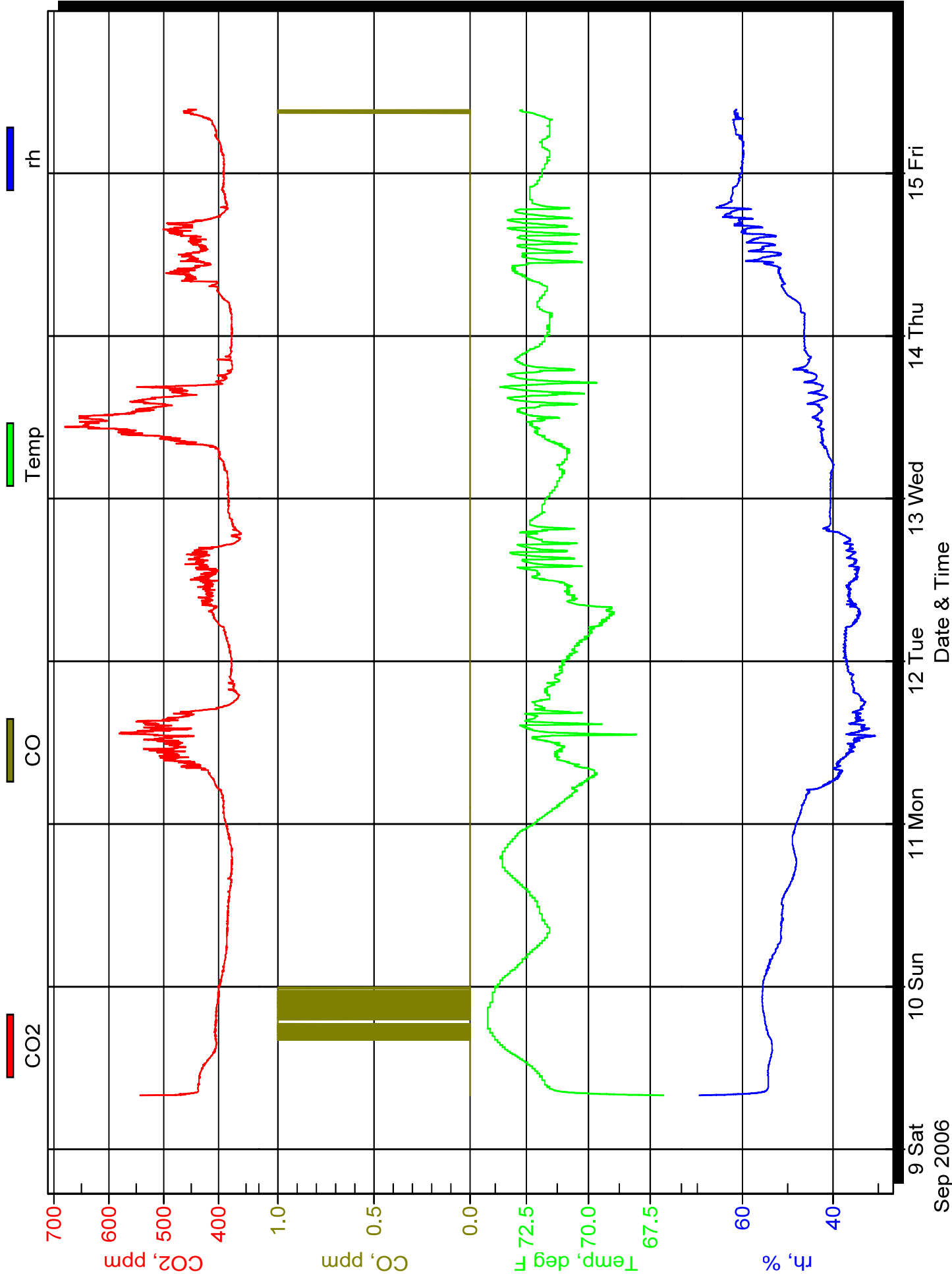
# District Court - Clerks Area Between Courtrooms A & B

Bennington State Office Buildings, ATC Project #63.03505.0035



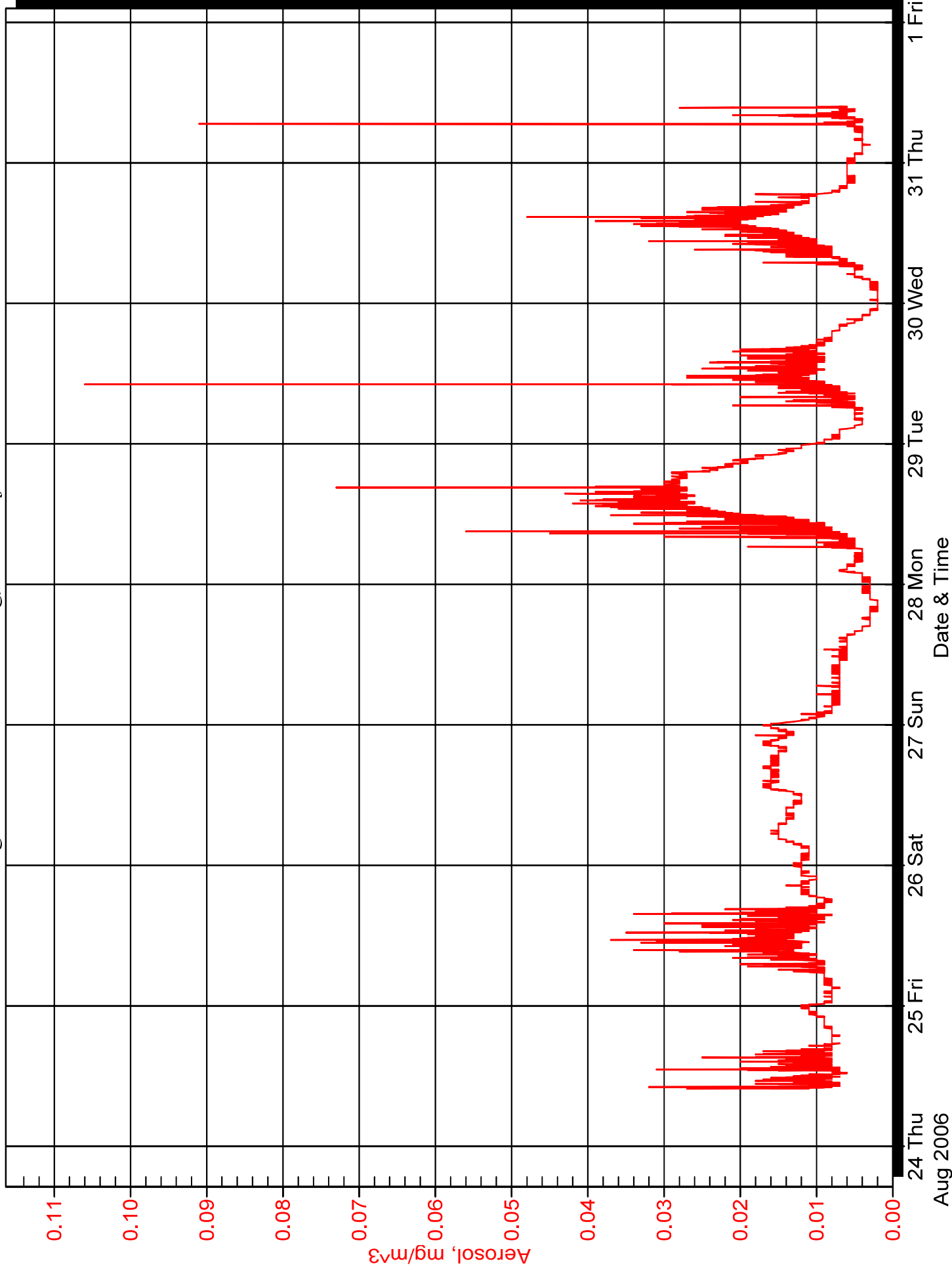
# District Court - Clerks Area Between Courtrooms A & B

Bennington State Office Buildings, ATC Project #63.03505.0035



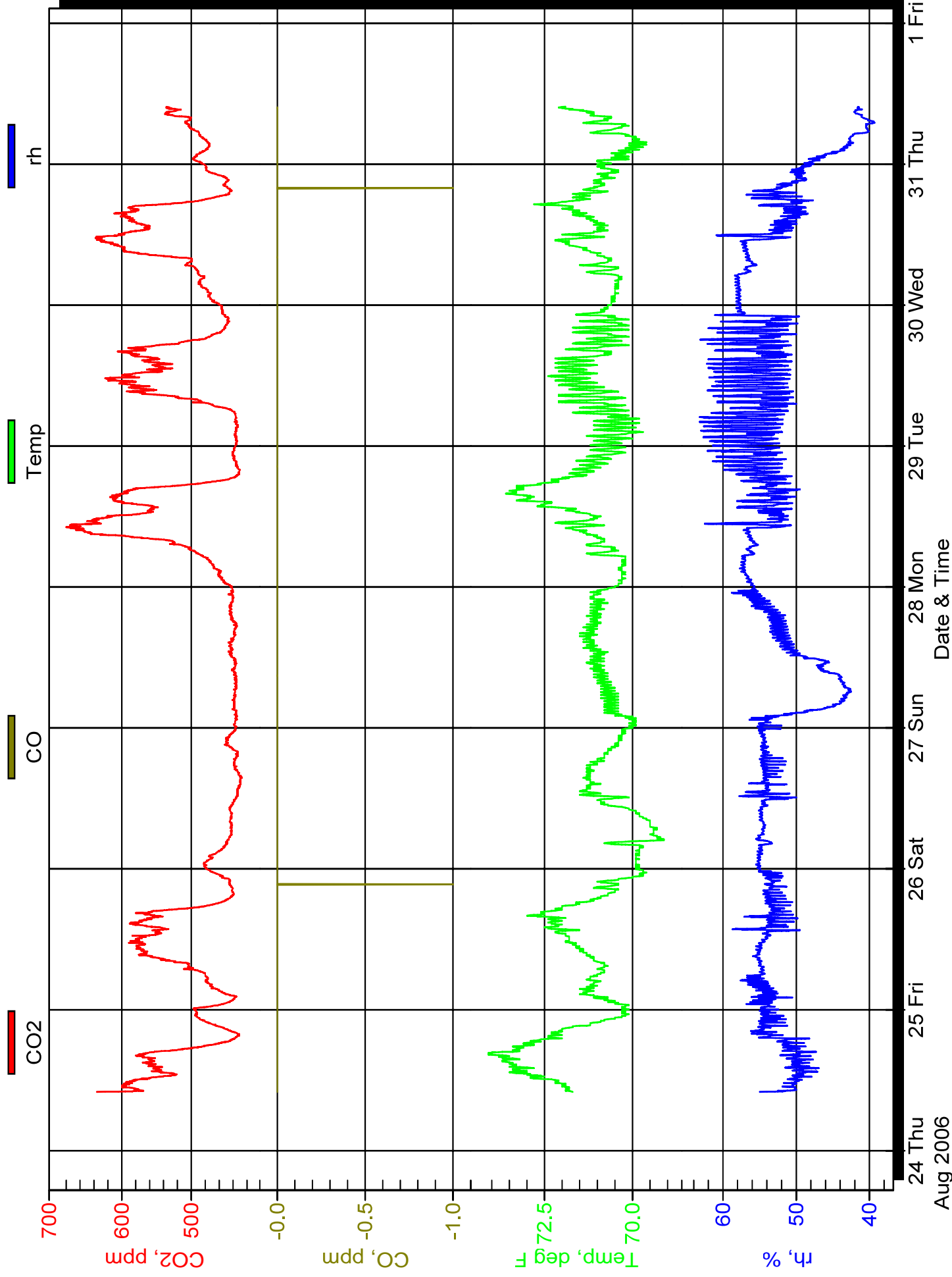
# Economic Services - Room 35

Bennington State Office Building, ATC Project #63.03505.0035



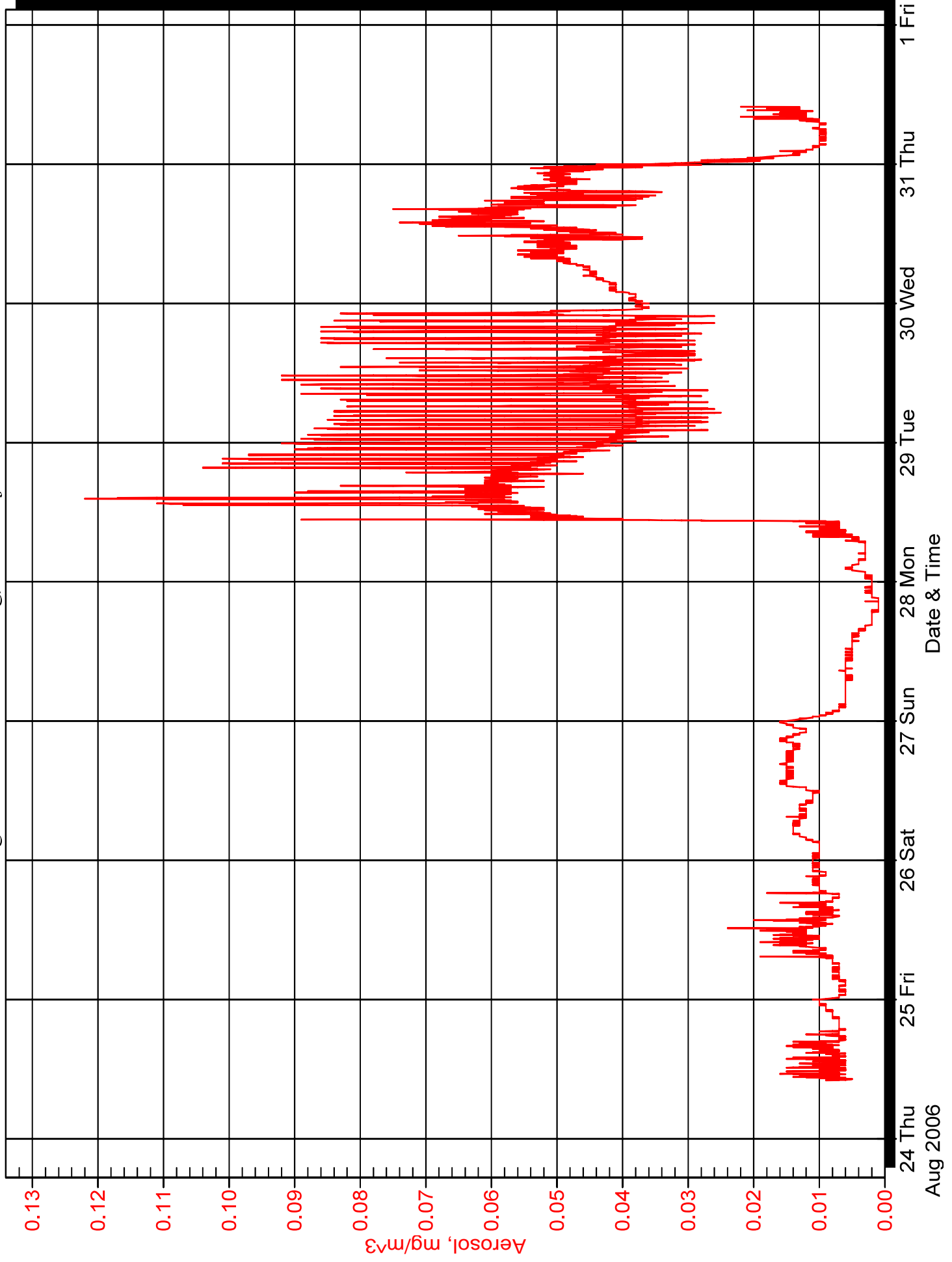
# Economic Services - Room 35

Bennington State Office Building, ATC Project #63.03505.0035



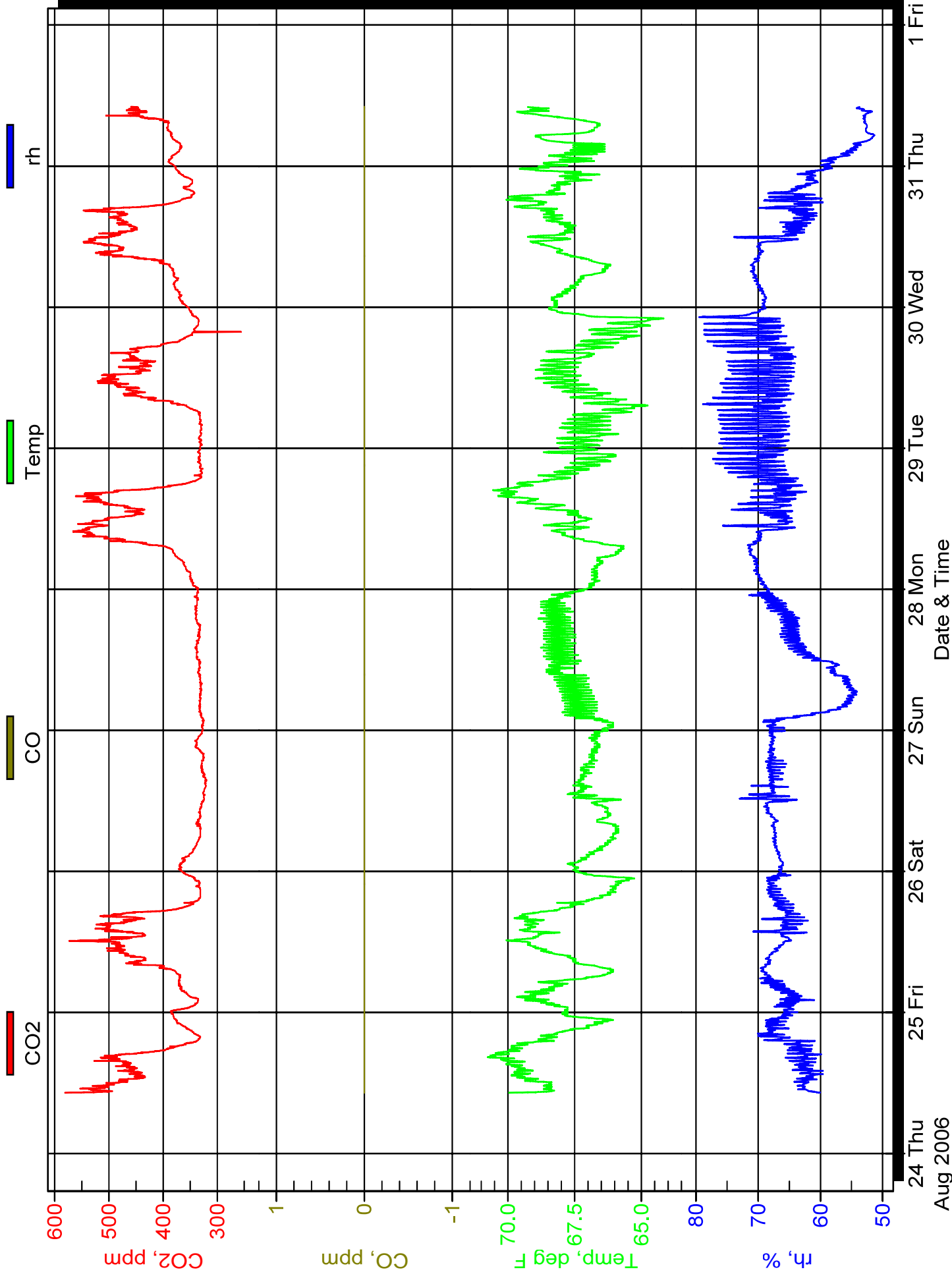
# Vocational Rehabilitation - Room 14

Bennington State Office Building, ATC Project # 63.03505.0035



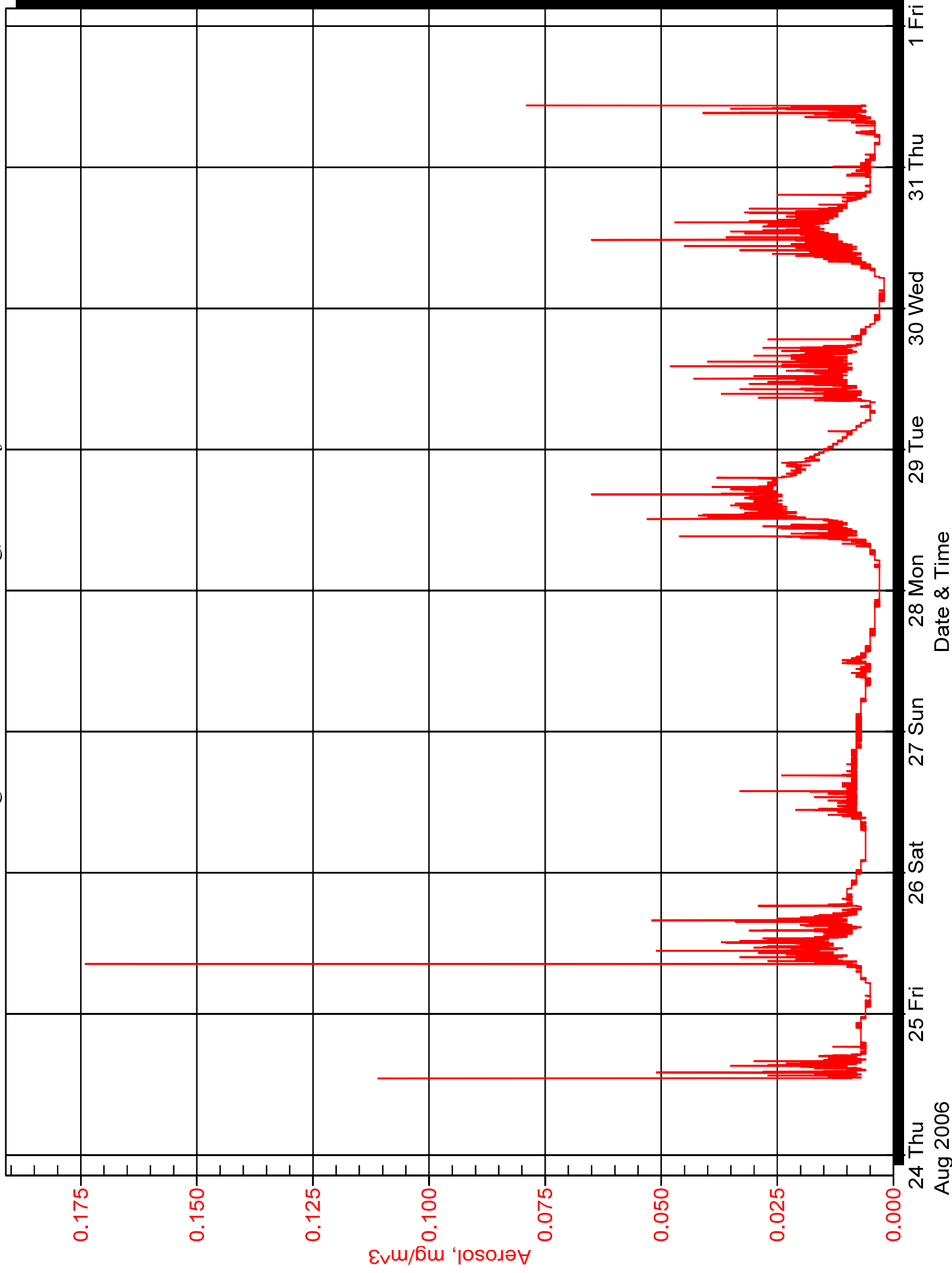
# Vocational Rehabilitation - Room 14

Bennington State Office Building, ATC Project #63.03505.0035



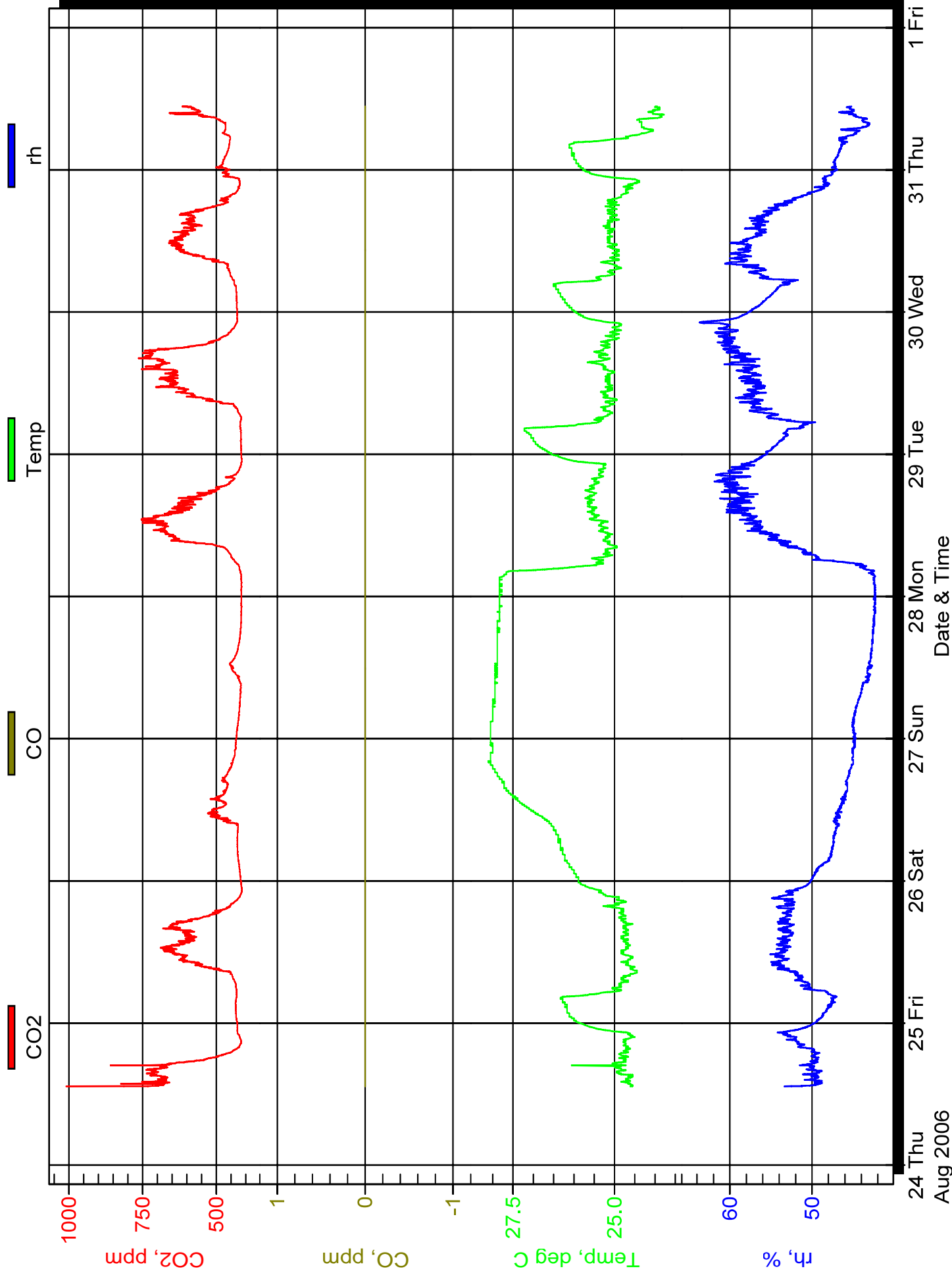
# Family Services - Hall Outside Rooms 325 and 324

Bennington State Office Building, ATC Project # 63.0



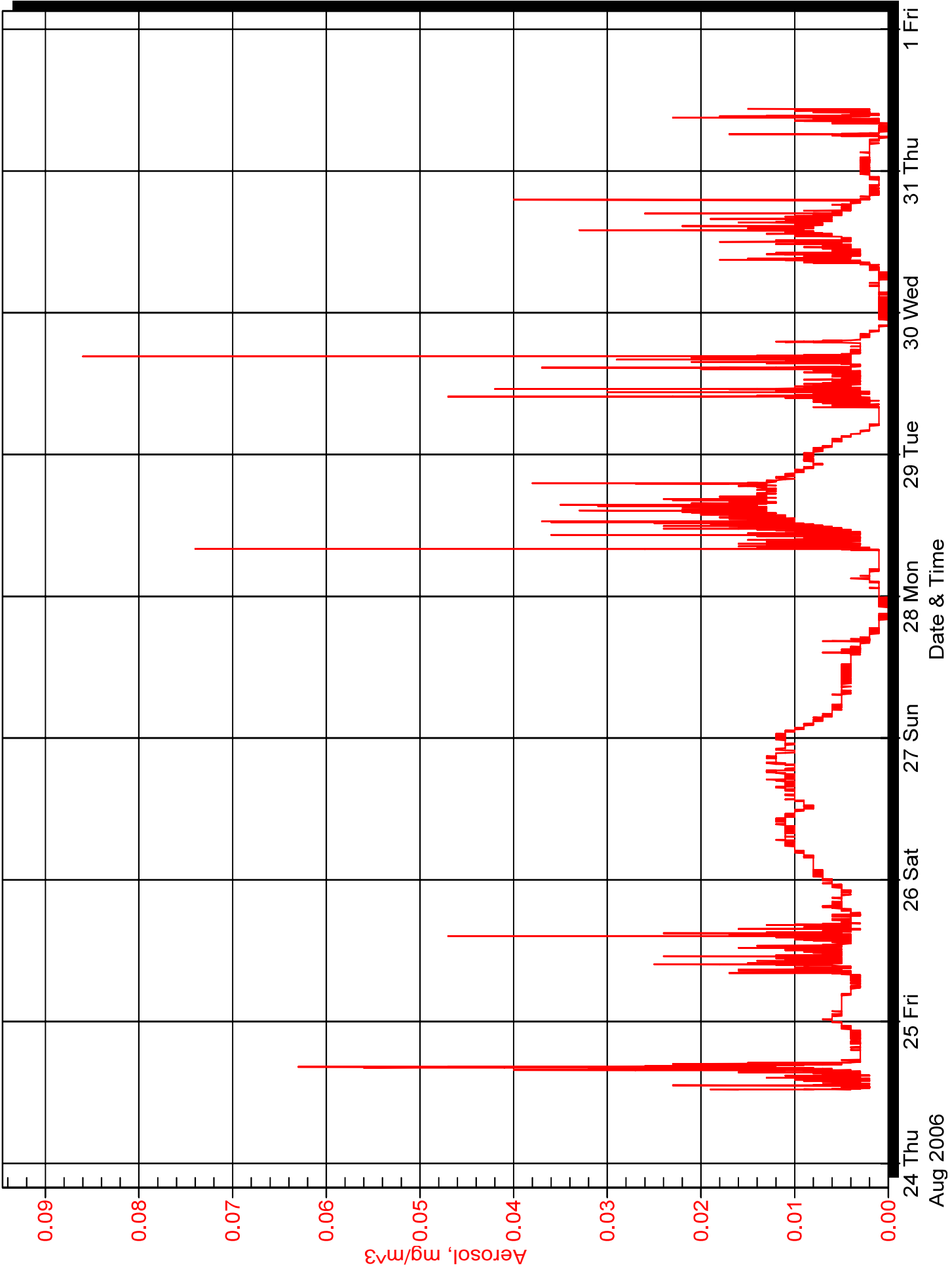
# Family Services - Hall Outside Rooms 325 and 324

Bennington State Office Building, ATC Project #63.03505.0035



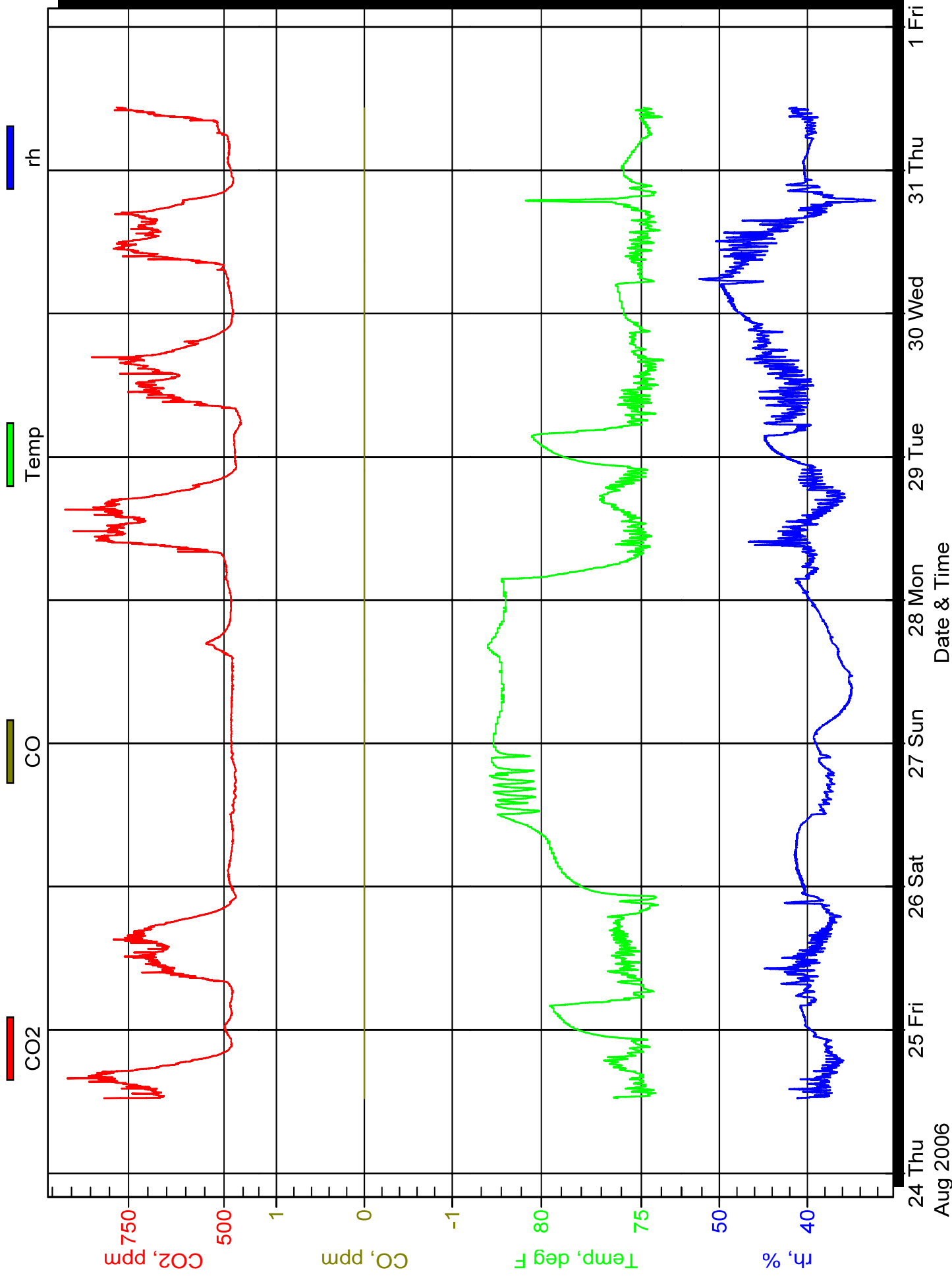
# Child Support - Hall Outside Room 237

Bennington State Office Building, ATC Project #63.03505.0035



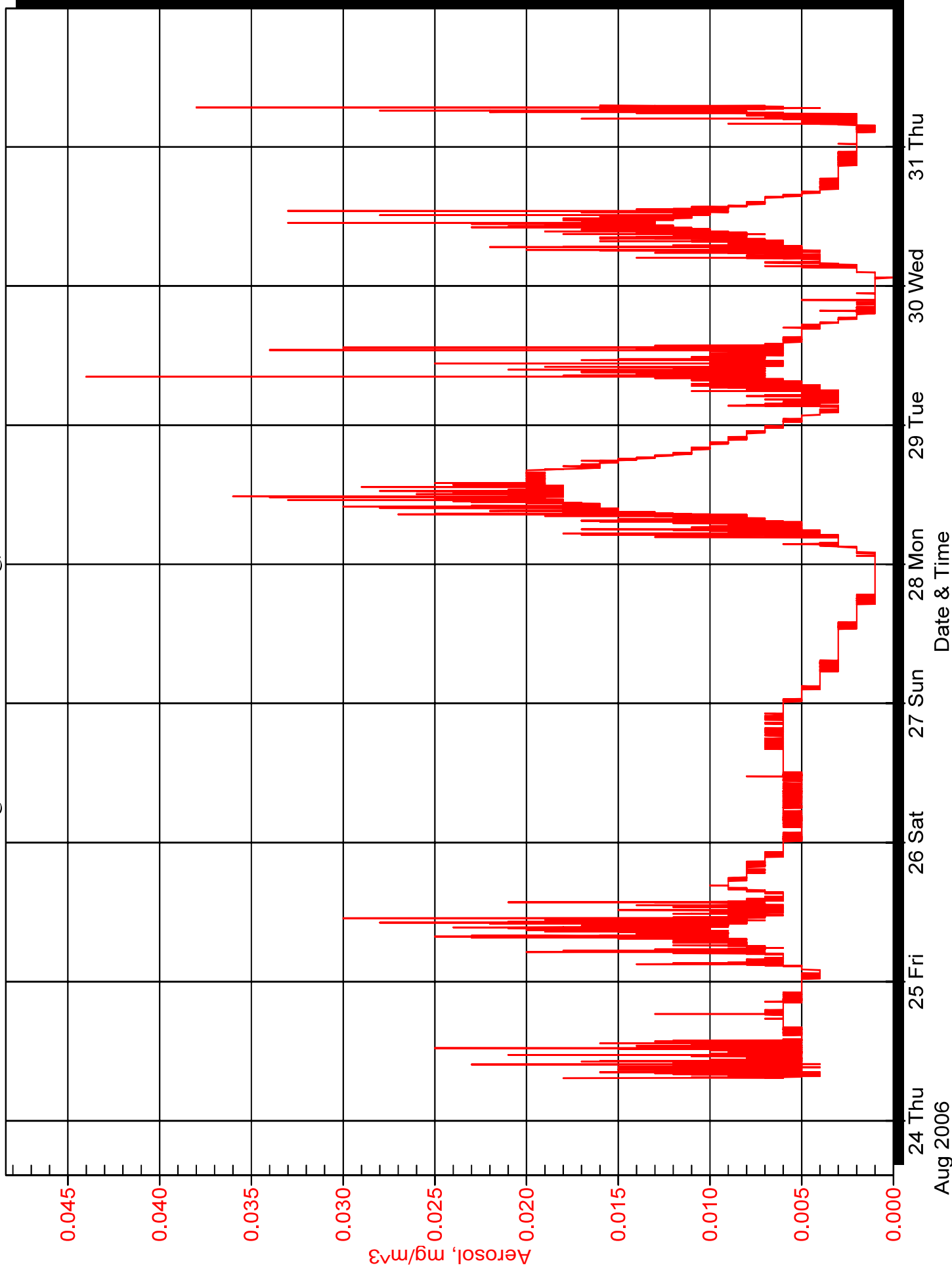
# Child Support - Hall Outside Room 237

Bennington State Office Building, ATC Project # 63.03505.0035



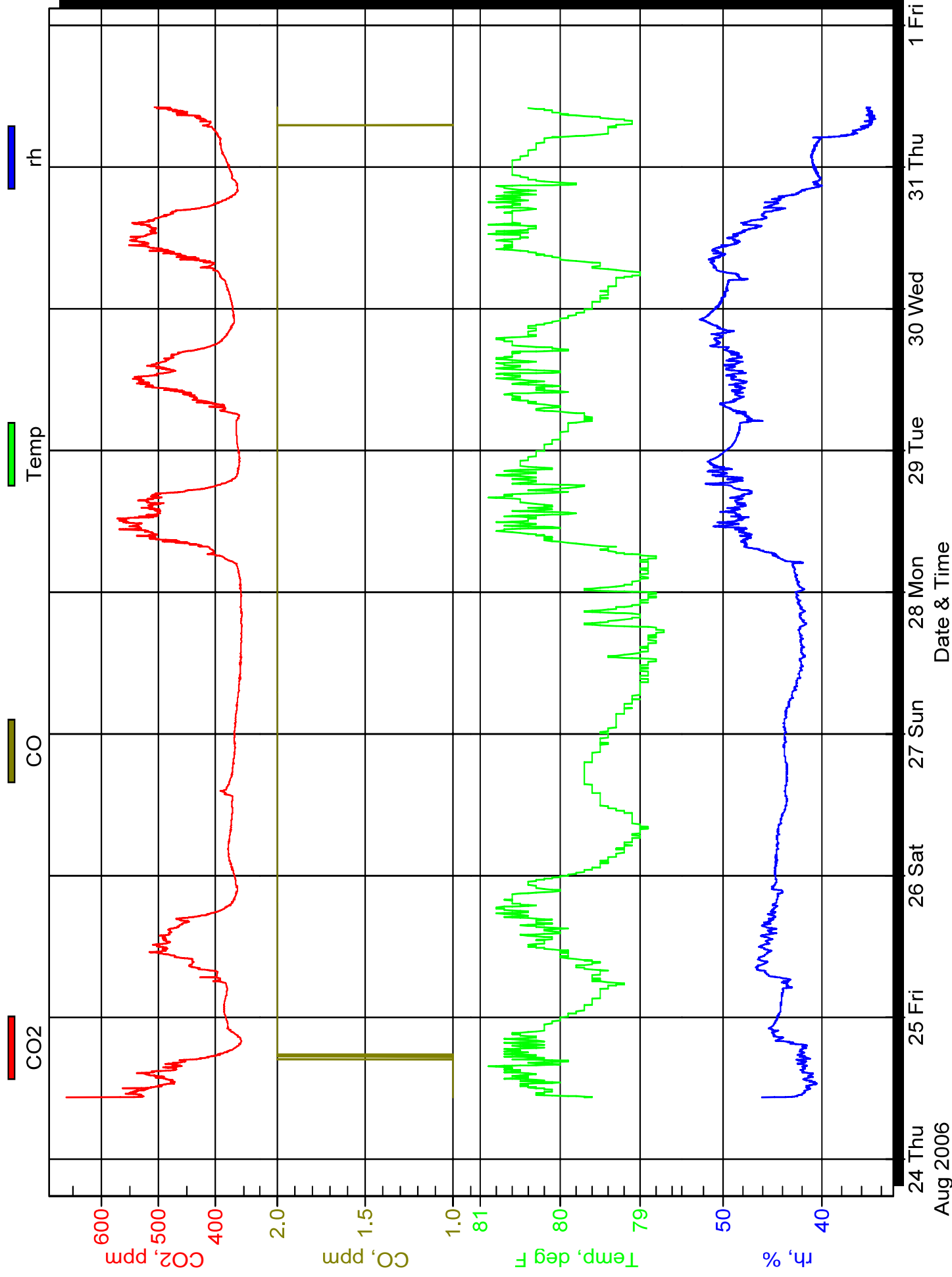
# Department of Labor - Center of Room 143

Bennington State Office Building, ATC #63.03505.0035



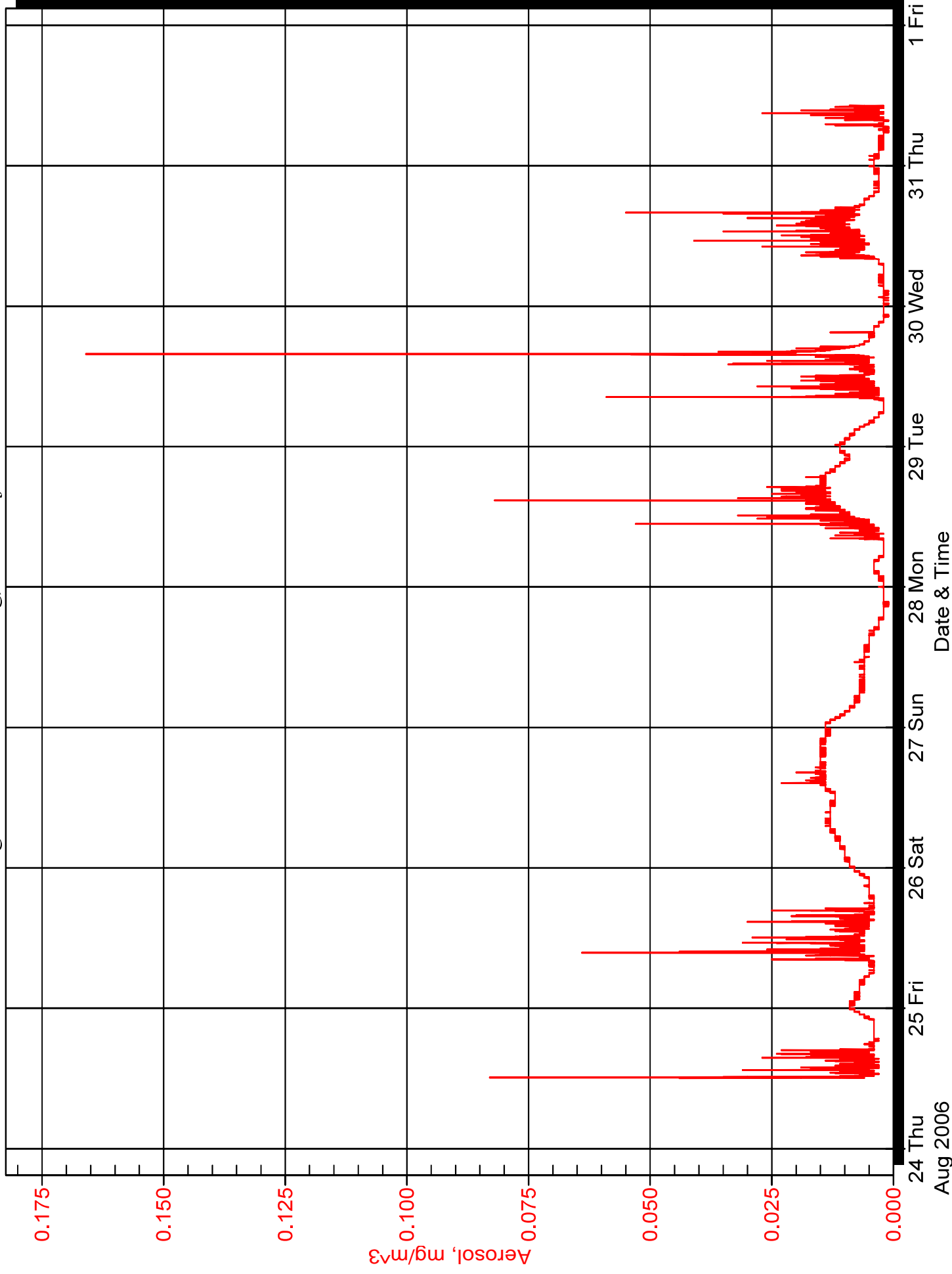
# Department of Labor - Center of Room 143

Bennington State Office Building, ATC Project #63.03505.0035



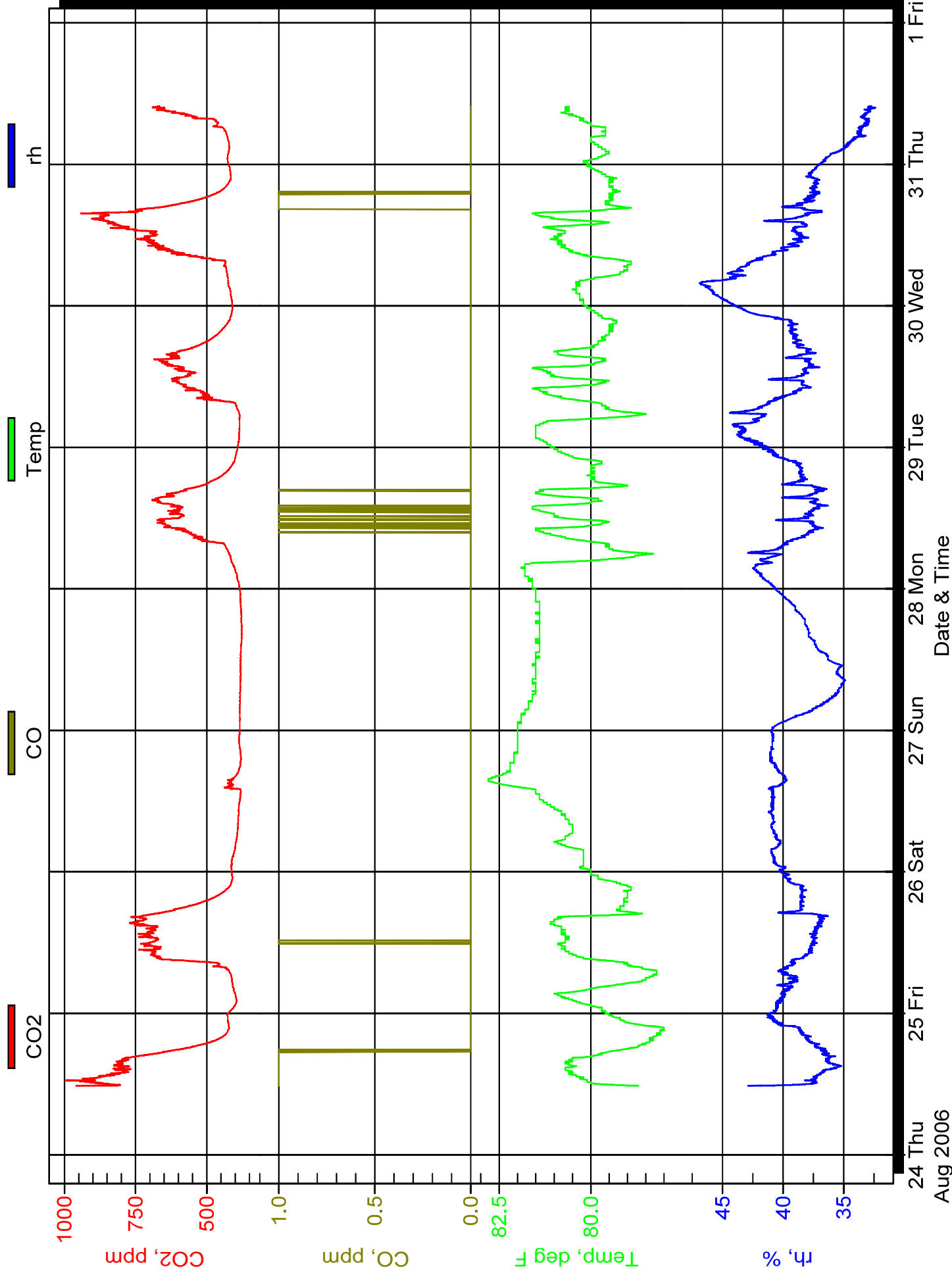
# Family Court - Center of Room 210

Bennington State Office Building, ATC Project #63.03505.0035



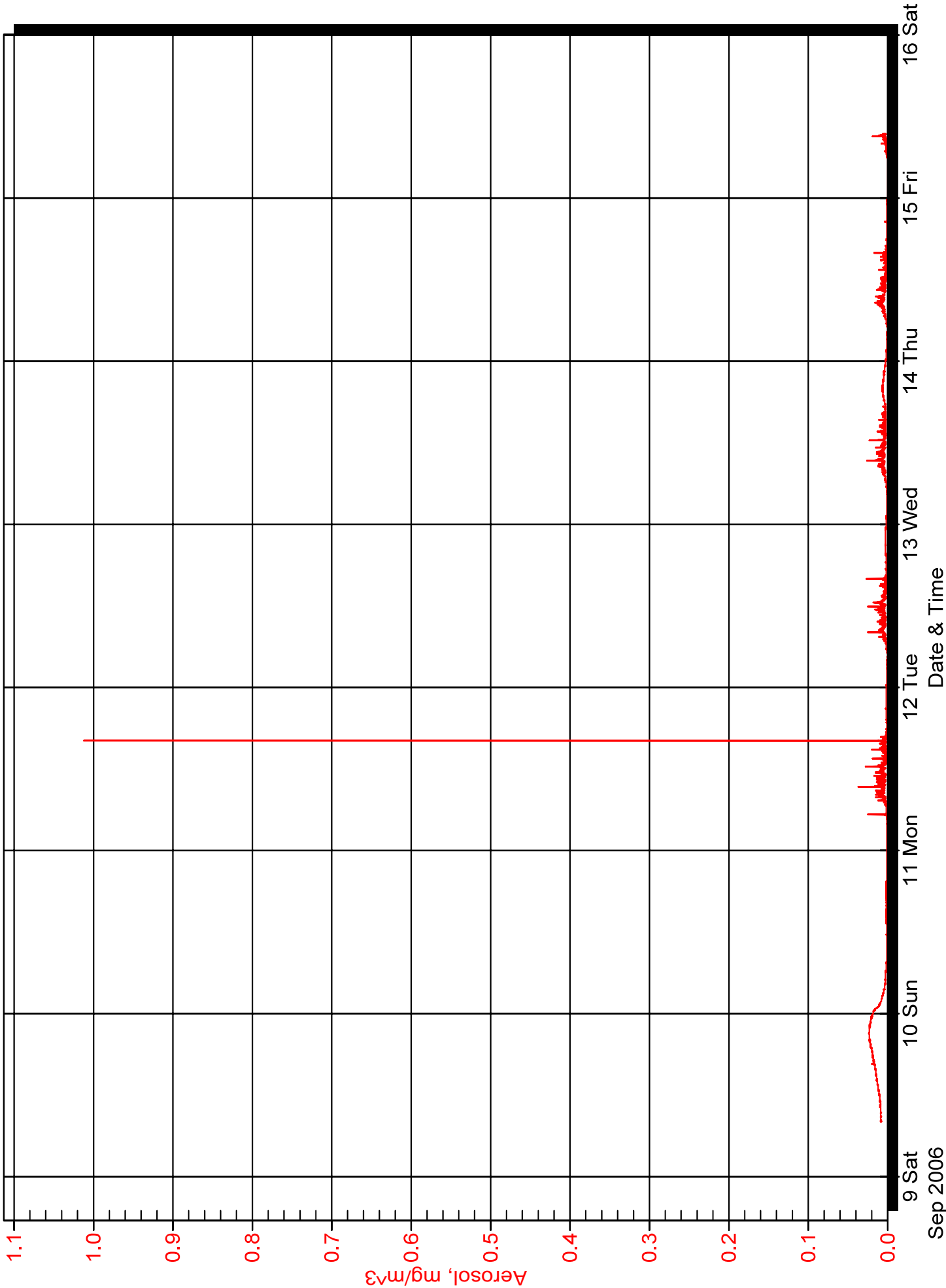
# Family Court - Center of Room 210

Bennington State Office Building, ATC Project #63.03505.0035



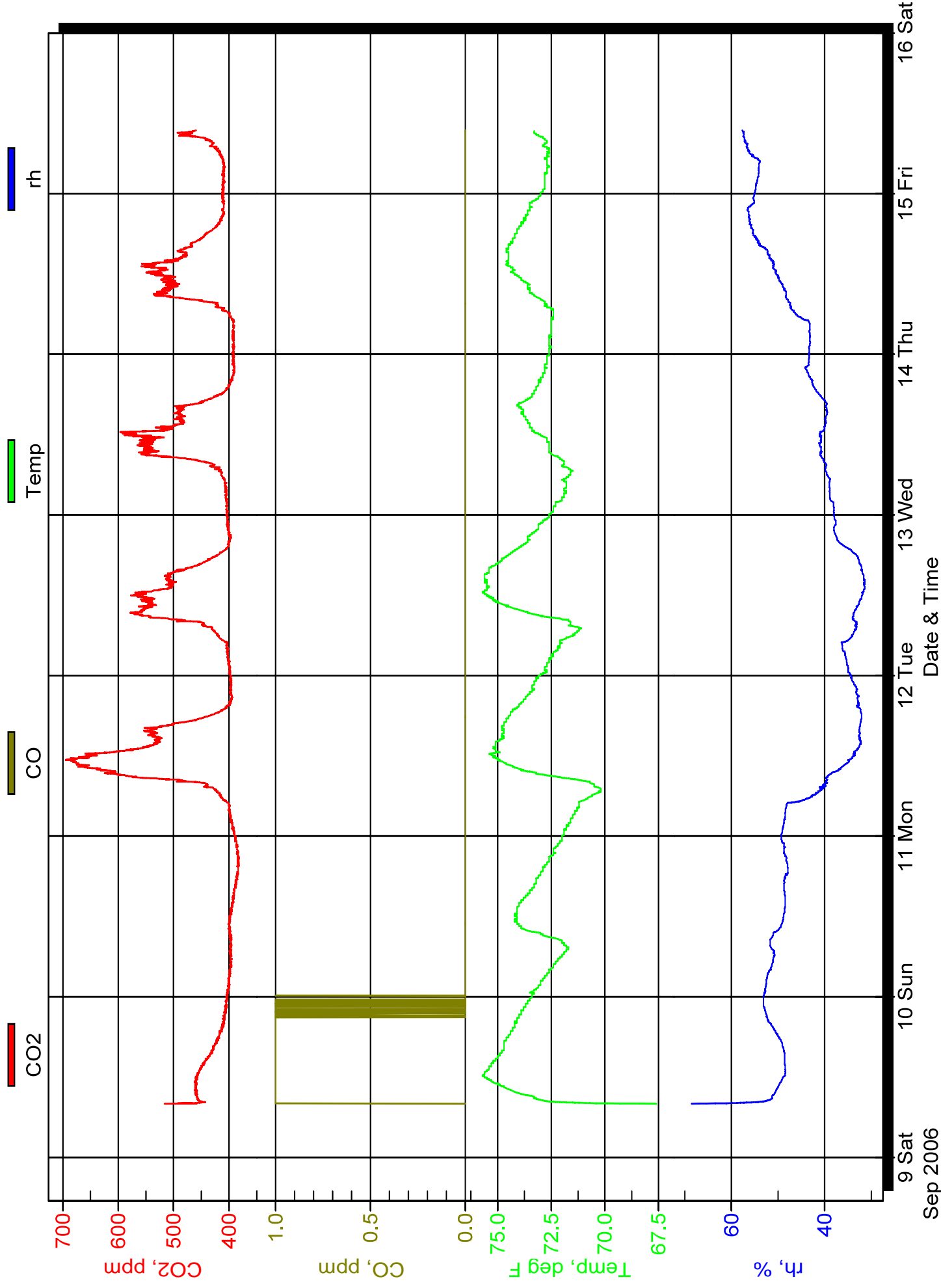
Department of Corrections - Hall Outside Room 121

Bennington State Office Building, ATC Project # 63.03505.0035



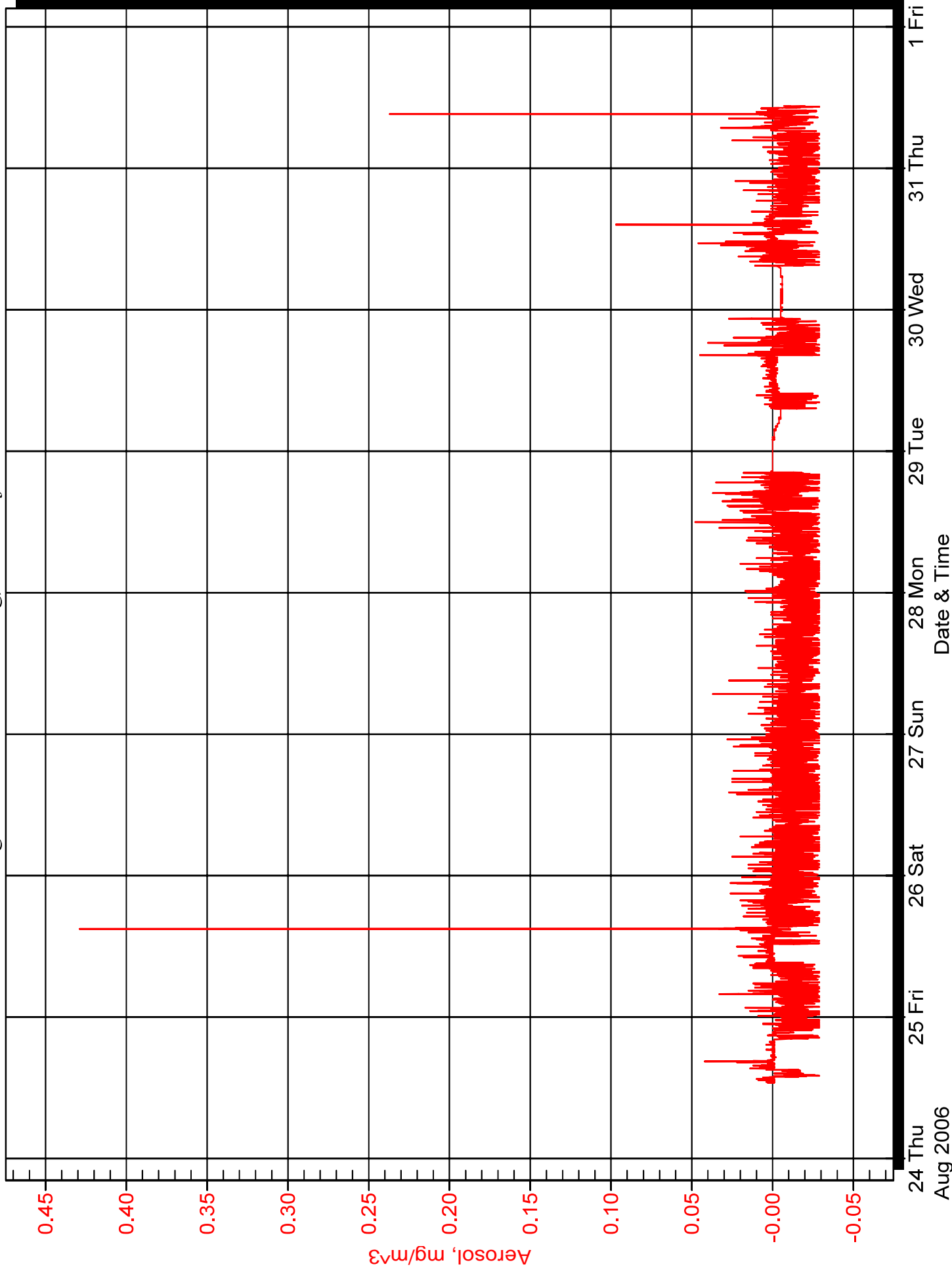
# Department of Corrections - Hall Outside Room 121

Bennington State Office Building, ATC Project #63.03505.0035



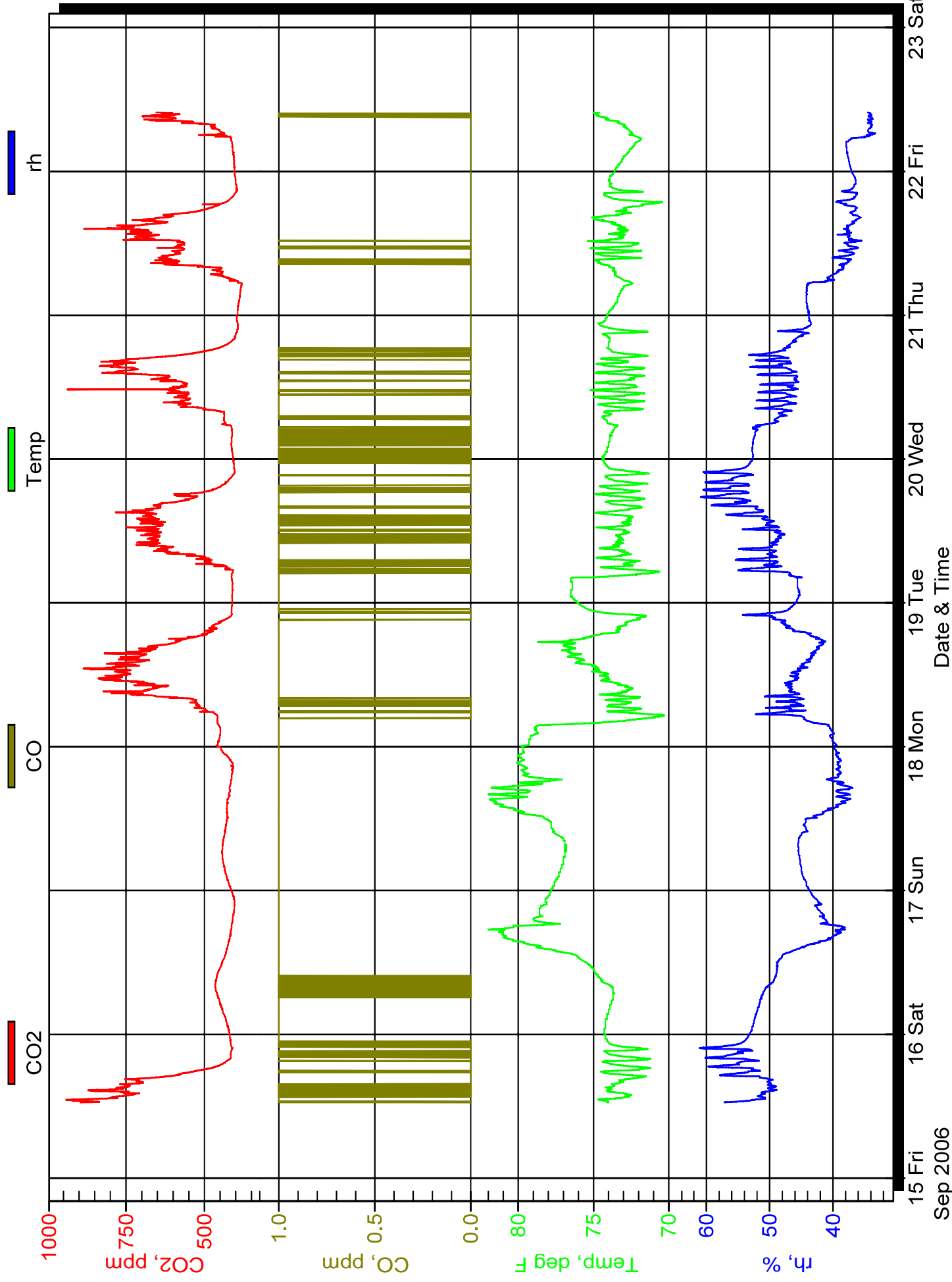
# State's Attorney - Room 354

Bennington State Office Building, ATC Project #63.03505.0035



# State's Attorney - Room 354

Bennington State Office Building, ATC Project #63.03505.0035



**APPENDIX C**  
**MICROBIAL VACUUM SAMPLING RESULTS**

Friday, September 1, 2006

Tom Broido  
ATC Associates, Inc.  
PO Box 3  
Richmond, VT 05477

Re: Project Number 750-608-1008 - 63.03505.0035



Dear Tom Broido:

P&K Microbiology is pleased to provide the enclosed report of analyses for samples received 08/28/2006. This cover letter and accompanying pages are an integral part of this report. All analyses are performed in our AIHA EMLAP accredited laboratory using the Best Laboratory Practices. The data generated in this report are based on the samples and accompanying information provided and represent concentrations at a point in time under the conditions sampled. Results can vary with site conditions. P&K Microbiology employees did not collect samples for this project, and may provide limited interpretation of this data as it relates to the overall investigation. For ecological information on fungi and bacteria identified in this report, please consult our publication, "The Ecology and Classification of Common Fungi and Bacteria Found in Indoor Environments". The latest edition of this publication can be ordered by calling a P&K Microbiology Project Manager toll free at 1 (866) 871-1984.

### **Quality Assurance**

P&K Microbiology is staffed with over 35 professionals, including PhD's, microbiologists, and mycologists with over 20 years of experience. The reliability of test results depends on many factors such as the personnel performing the tests, environmental conditions, selection and validation of test methods, equipment functioning, measurement traceability, as well as the sampling, storage and handling of test items, all of which are a reflection of the laboratories overall quality system.

P&K Microbiology has modeled its quality system after ISO 17025 guidelines, one of the most stringent sets of standards in the industry, to ensure that its customers receive the high standard of accuracy, reliability, and impartiality that they have come to expect from a leader in the environmental industry. P&K Microbiology's adherence to the standards set forth in the ISO 17025 guidelines has been validated and formally recognized through accreditations granted by the American Industrial Hygiene Association (AIHA). As an additional measure to demonstrate its competency to perform the analyses it offers to its clients, P&K Microbiology also participates in a variety of different proficiency testing programs, including the Environmental Microbiology Proficiency Analytical Testing Program (EMPAT) sponsored by the American Industrial Hygiene Association.

As part of its continuous commitment to excellence, P&K Microbiology is inspected by governmental agencies, independent commercial groups, and internal oversight personnel; these audits are in addition to those already mentioned above. Below you will find additional information regarding the specific analyses requested for this project.

P&K 100, 102, 105, 105A, 103, 103A, 104, 106, 106A

#### **Culture Analyses for Fungi and Bacteria**

Culturable microorganisms are those that are viable when media are inoculated, and will grow on the selected media and at the selected temperature.

The type of media and incubation temperature can vary depending on the scope of the survey. Isolates are identified to the service level requested. Typical analysis includes identification of most fungi to the species level, except for species of *Cladosporium* and *Penicillium*. Identification to the species level can be performed if requested in advance. General incubation parameters are summarized below. Incubation times can vary depending on specific growth characteristics. Samples submitted for culture analysis using Malt Extract Agar (MEA), DG-18, Cornmeal Agar (CMA) or Cellulose Agar are cultured for 7-10 days.

P&K Microbiology has published several excellent resources on culture analysis of fungi. Please refer to the following technical fact sheets: "Fungi in the Air: What do results of fungal air samples mean?"

<b>Test</b>	<b>Incubation Temperature (° C)</b>	<b>Minimum Incubation Time</b>
Environmental Bacteria	25	7-10 days
Total Fungi	25	7-10 days
Thermophilic fungi	35	7-10 days
Thermophilic Actinomycetes	55	5-7 days

#### **Common Culture Media**

<b>Acronym</b>	<b>Name</b>
BAP	Tryptic Soy Agar with 5% Sheep Blood
PCA	Plate Count Agar
BCYE	Buffered Charcoal Yeast Extract Agar
PDA	Potato Dextrose Agar
MEA	Malt Extract Agar
DG-18	Dichloran Glycerol Agar
SAB	Sabauroud's Dextrose Agar
RBA	Rose Bengal Agar
CMA	Cornmeal Agar

P&K 120

#### **Endotoxins**

This analysis utilizes the response of *Limulus Amebocyte Lysates* or LAL to endotoxin. The most sensitive of these techniques is a chromogenic kinetic assay that compares samples to standard endotoxin concentrations. The recent advent of adding zwitterions eliminates b-glucan interference. For more information, please refer to [www.aerotechpk.com](http://www.aerotechpk.com) and the technical fact sheet entitled "Endotoxins".

**Data Qualifiers**

The *Data Qualifiers* identify issues or events that are relevant to your analytical results. A data qualifier includes information about the validity, the source of the data whether calculated, entered or estimated, and the value of an observation. In each case the data qualifiers provide significant information vital to the interpretation of the laboratory data.

This communication is intended only for the individual or entity to which it is directed. It may contain information that is privileged, confidential, or otherwise exempt from disclosure under applicable law. Dissemination, distribution, or copying of this communication by anyone other than the intended recipient, or a duly designated employee or agent of such recipient, is prohibited. If you have received this communication in error, please notify us immediately by telephone at 1 (866) 871-1984, and delete this message and all attachments thereto.

For additional information, or if you have any questions regarding this report, please do not hesitate to call.

Sincerely,



Brian Kerin  
Project Manager  
P & K Microbiology  
856-489-4455

**Analytical References**

1. Medically Important Fungi: A Guide to Identification, 3rd ed., ASM, 1995.
2. Standard Methods for the Examination of Water and Wastewater, 19th ed., APHA, 1995.
3. Sampling and Identifying Allergenic Pollens and Molds, Blewstone, 1990.
4. Identifying Filamentous Fungi: A Clinical Laboratory Handbook, Star, 1996.
5. Manual of Clinical Microbiology, 7th ed., ASM, 1999.
6. A Laboratory Guide to Common *Aspergillus* Species and their Teleomorphs, CSIRO, 1994.
7. Bioaerosols: Assessment and Control, ACGIH, 1999.

Client: ATC Associates, Richmond, VT  
 Project ID: Bennington State Offices  
 Date Sampled: August 23, 2006  
 Date of Inoculation: August 28, 2006  
 Samples Submitted By: Tom Broido  
 Date Analysis Completed: September 6, 2006  
 Lab Number.: 750-608-1009

## Supplemental Information

### Fungi/Bacteria Analysis (Culture Method)

#### Bulk/Dust Samples

P&K Sample ID Client Sample ID Location	Total Weight (g)	Weight Used (g)	Area (m <sup>2</sup> )	Medium used	Dilution Factor	Fungal / Bacterial ID	Colony counts	Conc. (CFU/m <sup>2</sup> )	Percentage*
VAC-01 District court Clerk's office between courtrooms	0.256	0.136	2	MEA	100	Fungi			
						Alternaria alternaria	2	190	5%
						Aureobasidium pullulans	2	190	5%
						Cladosporium	3	280	8%
						Curvularia lunata	2	190	5%
						Epicoecum nigrum	3	280	8%
						Fusarium graminearum	1	90	3%
						Pithomyces chartarum	16	1,500	43%
						Rhodotorula glutinis	5	470	14%
						yeasts	3	280	8%
						Total: 3,470			
VAC-02 Hallway 75 Outside rm's 79 + 77	0.561	0.147	2	MEA	100	Fungi			
						Alternaria alternaria	4	760	8%
						Choanephora	1	190	2%
						Cladosporium	12	2,300	24%
						Epicoecum nigrum	7	1,300	14%
						Fusarium oxysporum	1	190	2%
						Fusarium solani	3	570	6%
						Mucor hiemalis	1	190	2%
						Pithomyces chartarum	10	1,900	20%
						Rhodotorula glutinis	9	1,700	18%
						Sterile fungi	3	570	6%
10,240								100%	
VAC-03 NE Corner of Hall 95	1.451	0.143	1.69	MEA	100	Fungi			
						Alternaria alternaria	4	2,400	9%
						Cladosporium	5	3,000	12%
						Curvularia lunata	2	1,200	5%
						Epicoecum nigrum	6	3,700	14%
						Mucor hiemalis	1	600	2%
						Penicillium	2	1,200	5%
						Pithomyces chartarum	17	10,100	40%
						Rhodotorula glutinis	5	3,000	12%
						Sterile fungi	1	600	2%
25,800								100%	

P&K Sample ID Client Sample ID Location	Total Weight (g)	Weight Used (g)	Area (m <sup>2</sup> )	Medium used	Dilution Factor	Fungal / Bacterial ID	Colony counts	Conc. (CFU/m <sup>2</sup> )	Percentage*
VAC-04 Room 14 @ Door to room 15	0.54	0.113	2	MEA	100	Fungi Cladosporium Mucor hiemalis	1 1	240 240 480	50% 50% 100%
VAC-05 Room 35 Southwest Corner	1.051	0.148	2	MEA	100	Fungi Cladosporium Pithomyces chartarum Sterile fungi	1 10 2	360 3,600 710 4,670	8% 77% 15% 100%
VAC-06 Room 56 Outside room 57	0.32	0.14	2	MEA	100	Fungi Alternaria alternaria Cladosporium Curvularia lunata Fusarium solani Pithomyces chartarum Rhodotorula glutinis Sterile fungi yeasts	4 9 1 1 4 3 2 3	460 1,000 110 110 460 340 230 340 3,050	15% 33% 4% 4% 15% 11% 7% 11% 100%
VAC-07 Room 123 Outside rm. 121	0.612	0.127	2	MEA	1600	Fungi Alternaria alternaria Cladosporium Epicoccum nigrum Penicillium Rhodotorula glutinis Sterile fungi yeasts	2 1 1 1 24 1 16	7,700 3,900 3,900 3,900 93,000 3,900 62,000 178,300	4% 2% 2% 2% 52% 2% 35% 100%
VAC-08 Room 143-Center	0.594	0.15	2	MEA	100	Fungi Cladosporium Epicoccum nigrum Fusarium graminearum Penicillium Rhizopus stolonifer Rhodotorula glutinis Sterile fungi	11 3 1 1 1 7 1	2,200 600 200 200 200 1,400 200 5,000	44% 12% 4% 4% 4% 28% 4% 100%

P&K Sample ID Client Sample ID Location	Total Weight (g)	Weight Used (g)	Area (m <sup>2</sup> )	Medium used	Dilution Factor	Fungal / Bacterial ID	Colony counts	Conc. (CFU/m <sup>2</sup> )	Percentage*
VAC-09 Hall outside Rm 237 + 238	0.399	0.148	2	MEA	100	Fungi			
						Alternaria alternaria	3	400	8%
						Aureobasidium pullulans	3	400	8%
						Cladosporium	2	270	5%
						Epicoccum nigrum	4	540	10%
						Pithomyces chartarum	23	3,100	59%
						Rhodotorula glutinis	2	270	5%
						Sterile fungi	2	270	5%
								5,250	100%
VAC-10 Rm. 356-Center	0.503	0.14	2	MEA	100	Fungi			
						Cladosporium	4	720	13%
						Epicoccum nigrum	7	1,300	22%
						Fusarium solani	1	180	3%
						Pithomyces chartarum	19	3,400	59%
						Sterile fungi	1	180	3%
								5,780	100%
VAC-11 Hall Outside Rm 324	0.788	0.138	2	MEA	100	Fungi			
						Cladosporium	6	1,700	15%
						Epicoccum nigrum	7	2,000	18%
						Mucor hiemalis	2	570	5%
						Pithomyces chartarum	19	5,400	49%
						Rhodotorula glutinis	5	1,400	13%
								11,070	100%
VAC-12 Rm. 210-Center	0.229	0.147	2	MEA	100	Fungi			
						Cladosporium	3	230	18%
						Epicoccum nigrum	7	550	41%
						Fusarium solani	2	160	12%
						Mucor hiemalis	1	80	6%
						Rhodotorula glutinis	10	780	59%
						Sterile fungi	2	160	12%
						yeasts	2	160	12%
								2,120	100%

The sample(s) in this report was/were received in acceptable conditions.

\* Percentage of each group of fungi/bacteria in total population.

\*\* Concentration is rounded to two significant digits. Concentration is in CFU/Sample if sample amount/area is NA.

Media types: Actinomycete Isolation Agar (AIA), cornmeal agar (CMA), 2% malt extract agar (MEA), inhibitory mold agar (IMA), pseudomonas isolation agar (PIA), rose bengal agar (RBA), sabouraud dextrose agar (SDA), tryptic soy agar (TSA), nutrient agar (NTA), blood agar (BA), staphylococcus medium 110 (Staphy), phenylethyl alcohol agar w/ 5% sheep blood (PEA). The detection limit of fungal and bacteria analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.

This report document includes additional information by client request that is not part of our QA controlled procedure. The client requested the results in CFU/in<sup>2</sup>. The SOP calls for reporting units of CFU/g. The CFU/in<sup>2</sup> results above were extrapolated mathematically from the CFU/g results.

Client: ATC Associates, Inc., Richmond, VT 05477  
 Project ID: 63-03505.0035  
 Date Sampled: 08/23/2006  
 Contact: Tom Broido  
 P&K Report Number: 750-608-1009  
 Date of Incubation: 08/28/2006  
 Date Analysis Completed: 09/06/2006

Fungal Analysis (Culture Method)

Bulk Dust Samples

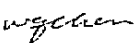
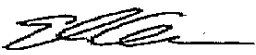
P&K Sample ID Client Sample ID Location	Total Dust Wgt (g)	Weight Used (g)	Medium Used	Dilution Factor	Fungal ID	Colony Counts	Conc. ** (CFU/g)	%*
1 VAC-01	0.256	0.136	MEA	100	Fungi Alternaria alternata Aureobasidium pullulans Cladosporium Curvularia lunata Epicoccum nigrum Fusarium graminearum Pithomyces chartarum Rhodotorula glutinis yeasts	2 2 3 2 3 1 16 5 3	1,470 1,470 2,210 1,470 2,210 735 11,800 3,680 2,210 Total: 27,200	5 5 8 5 8 3 43 14 8 100
2 VAC-02	0.561	0.147	MEA	100	Fungi Alternaria alternata Choanephora Cladosporium Epicoccum nigrum Fusarium oxysporum Fusarium solani Mucor hiemalis Pithomyces chartarum Rhodotorula glutinis Sterile fungi	4 1 12 7 1 3 1 10 9 3	2,720 680 8,160 4,760 680 2,040 680 6,800 6,120 2,040 Total: 34,700	8 2 24 14 2 6 2 20 18 6 100

The sample(s) in this report was/were received in acceptable conditions.

\* Percentage of each group of fungi/bacteria in total population.

\*\* Concentration is rounded to two significant digits. Concentration is in CFU/Sample if sample amount/area is NA.

Media types: Actinomycete Isolation Agar (AIA), cornmeal agar (CMA), 2% malt extract agar (MEA), inhibitory mold agar (IMA), pseudomonas isolation agar (PIA), rose bengal agar (RBA), sabouraud dextrose agar (SDA), tryptic soy agar (TSA), nutrient agar (NTA), blood agar (BAP), staphylococcus medium 110 (Staphy), phenylethyl alcohol agar w/ 5% sheep blood (PEA), plate count agar (PCA). The detection limit of fungal and bacteria analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.

  
 Lab Review  
  
 Final Review

Client: ATC Associates, Inc., Richmond, VT 05477  
 Project ID: 63-03505.0035  
 Date Sampled: 08/23/2006  
 Contact: Tom Broido  
 P&K Report Number: 750-608-1009  
 Date of Incubation: 08/28/2006  
 Date Analysis Completed: 09/06/2006

## Fungal Analysis (Culture Method)

### Bulk Dust Samples

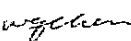
P&K Sample ID Client Sample ID Location	Total Dust Wgt (g)	Weight Used (g)	Medium Used	Dilution Factor	Fungal ID	Colony Counts	Conc. ** (CFU/g)	%*
3 VAC-03	1.451	0.143	MEA	100	Fungi			
					Alternaria alternata	4	2,800	9
					Cladosporium	5	3,500	12
					Curvularia lunata	2	1,400	5
					Epilcoccum nigrum	6	4,200	14
					Mucor hiemalis	1	699	2
					Penicillium	2	1,400	5
					Pithomyces chartarum	17	11,900	40
					Rhodotorula glutinis	5	3,500	12
					Sterile fungi	1	699	2
							Total: 30,100	100
4 VAC-04	0.540	0.113	MEA	100	Fungi			
					Cladosporium	1	885	50
					Mucor hiemalis	1	885	50
							Total: 1,770	100
5 VAC-05	1.051	0.148	MEA	100	Fungi			
					Cladosporium	1	676	8
					Pithomyces chartarum	10	6,760	77
					Sterile fungi	2	1,350	15
							Total: 8,780	100

The sample(s) in this report was/were received in acceptable conditions.

\* Percentage of each group of fungi/bacteria in total population.


\*\* Concentration is rounded to two significant digits. Concentration is in CFU/Sample if sample amount/area is NA.

Media types: Actinomycete Isolation Agar (AIA), cornmeal agar(CMA), 2% malt extract agar(MEA), inhibitory mold agar(IMA), pseudomonas isolation agar(PIA), rose bengal agar(RBA), sabouraud dextrose agar(SDA), tryptic soy agar(TSA), nutrient agar(NTA), blood agar(BAP), staphylococcus medium 110(Staphy), phenylethyl alcohol agar w/ 5% sheep blood (PEA), plate count agar(PCA). The detection limit of fungal and bacteria analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.



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Lab Review



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Final Review

Client: ATC Associates, Inc., Richmond, VT 05477  
 Project ID: 63-03505.0035  
 Date Sampled: 08/23/2006  
 Contact: Tom Broido  
 P&K Report Number: 750-608-1009  
 Date of Incubation: 08/28/2006  
 Date Analysis Completed: 09/06/2006

Fungal Analysis (Culture Method)

Bulk Dust Samples

P&K Sample ID Client Sample ID Location	Total Dust Wgt (g)	Weight Used (g)	Medium Used	Dilution Factor	Fungal ID	Colony Counts	Conc. ** (CFU/g)	%*
6 VAC-06	0.320	0.140	MEA	100	Fungi Alternaria alternata Cladosporium Curvularia lunata Fusarium solani Pithomyces chartarum Rhodotorula glutinis Sterile fungi yeasts	4 9 1 1 4 3 2 3	2,860 6,430 714 714 2,860 2,140 1,430 2,140 Total: 19,300	15 33 4 4 15 11 7 11 100
7 VAC-07	0.612	0.127	MEA	1600	Fungi Alternaria alternata Cladosporium Epicoccum nigrum Penicillium Rhodotorula glutinis Sterile fungi yeasts	2 1 1 1 24 1 16	25,200 12,600 12,600 12,600 302,000 12,600 202,000 Total: 580,000	4 2 2 2 52 2 35 100
8 VAC-08	0.594	0.150	MEA	100	Fungi Cladosporium Epicoccum nigrum Fusarium graminearum Penicillium Rhizopus stolonifer Rhodotorula glutinis Sterile fungi	11 3 1 1 1 7 1	7,330 2,000 667 667 667 4,670 667 Total: 16,700	44 12 4 4 4 28 4 100

The sample(s) in this report was/were received in acceptable conditions.

\* Percentage of each group of fungi/bacteria in total population.

\*\* Concentration is rounded to two significant digits. Concentration is in CFU/Sample if sample amount/area is NA.

Media types: Actinomycete Isolation Agar (AIA), cornmeal agar (CMA), 2% malt extract agar (MEA), inhibitory mold agar (IMA), pseudomonas isolation agar (PIA), rose bengal agar (RBA), sabouraud dextrose agar (SDA), tryptic soy agar (TSA), nutrient agar (NTA), blood agar (BAP), staphylococcus medium 110 (Staphy), phenylethyl alcohol agar w/ 5% sheep blood (PEA), plate count agar (PCA). The detection limit of fungal and bacteria analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.

*wjchen*

Lab Review

*[Signature]*

Final Review

Client: ATC Associates, Inc., Richmond, VT 05477  
 Project ID: 63-03505.0035  
 Date Sampled: 08/23/2006  
 Contact: Tom Broido  
 P&K Report Number: 750-608-1009  
 Date of Incubation: 08/28/2006  
 Date Analysis Completed: 09/06/2006

Fungal Analysis (Culture Method)

Bulk Dust Samples

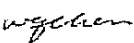
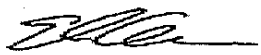
P&K Sample ID Client Sample ID Location	Total Dust Wgt (g)	Weight Used (g)	Medium Used	Dilution Factor	Fungal ID	Colony Counts	Conc. ** (CFU/g)	%*
9 VAC-09	0.399	0.148	MEA	100	Fungi Alternaria alternata Aureobasidium pullulans Cladosporium Epicoccum nigrum Pithomyces chartarum Rhodotorula glutinis Sterile fungi	3 3 2 4 23 2 2	2,030 2,030 1,350 2,700 15,500 1,350 1,350 Total: 26,400	8 8 5 10 59 5 5 100
10 VAC-10	0.503	0.140	MEA	100	Fungi Cladosporium Epicoccum nigrum Fusarium solani Pithomyces chartarum Sterile fungi	4 7 1 19 1	2,860 5,000 714 13,600 714 Total: 22,900	13 22 3 59 3 100
11 VAC-11	0.788	0.138	MEA	100	Fungi Cladosporium Epicoccum nigrum Mucor hiemalis Pithomyces chartarum Rhodotorula glutinis	6 7 2 19 5	4,350 5,070 1,450 13,800 3,620 Total: 28,300	15 18 5 49 13 100

The sample(s) in this report was/were received in acceptable conditions.

\* Percentage of each group of fungi/bacteria in total population.

\*\* Concentration is rounded to two significant digits. Concentration is in CFU/Sample if sample amount/area is NA.

Media types: Actinomycete Isolation Agar (AIA), cornmeal agar (CMA), 2% malt extract agar (MEA), inhibitory mold agar (IMA), pseudomonas isolation agar (PIA), rose bengal agar (RBA), sabouraud dextrose agar (SDA), tryptic soy agar (TSA), nutrient agar (NTA), blood agar (BAP), staphylococcus medium 110 (Staphy), phenylethyl alcohol agar w/ 5% sheep blood (PEA), plate count agar (PCA). The detection limit of fungal and bacteria analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.

  
 Lab Review  
  
 Final Review

Client: ATC Associates, Inc., Richmond, VT 05477  
 Project ID: 63-03505.0035  
 Date Sampled: 08/23/2006  
 Contact: Tom Broido  
 P&K Report Number: 750-608-1009  
 Date of Incubation: 08/28/2006  
 Date Analysis Completed: 09/06/2006

Fungal Analysis (Culture Method)

Bulk Dust Samples

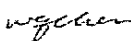

P&K Sample ID Client Sample ID Location	Total Dust Wgt (g)	Weight Used (g)	Medium Used	Dilution Factor	Fungal ID	Colony Counts	Conc. ** (CFU/g)	%*
12 VAC-12	0.229	0.147	MEA	100	Fungi Cladosporium Epilicoccus nigrum Fusarium solani Mucor hiemalis Rhodotorula glutinis Sterile fungi yeasts	3 7 2 1 10 2 2	2,040 4,760 1,360 680 6,800 1,360 1,360 Total: 18,400	11 26 7 4 37 7 7 100

The sample(s) in this report was/were received in acceptable conditions.

\* Percentage of each group of fungi/bacteria in total population.

\*\* Concentration is rounded to two significant digits. Concentration is in CFU/Sample if sample amount/area is NA.

Media types: Actinomycete Isolation Agar (AIA), cornmeal agar (CMA), 2% malt extract agar (MEA), Inhibitory mold agar (IMA), pseudomonas isolation agar (PIA), rose bengal agar (RBA), sabouraud dextrose agar (SDA), tryptic soy agar (TSA), nutrient agar (NTA), blood agar (BAP), staphylococcus medium 110 (Staphy), phenylethyl alcohol agar w/ 5% sheep blood (PEA), plate count agar (PCA). The detection limit of fungal and bacteria analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.

  
 Lab Review  
  
 Final Review

**Test Report - Endotoxin Analysis (Kinetic Chromogenic Method)**

Client: ATC Associates, Richmond, VT  
Project ID: Bennington State Offices  
Samples Submitted By: Tom Brodio  
Date Sampled: August 23, 2006  
Date Samples Received: August 28, 2006  
Date Analysis Completed: August 31, 2006  
P&K Report No.: 750-608-1009

**Sample Type: Dust****Supplemental Information**

Sample ID	Dust Used (g)	Area (m <sup>2</sup> )	Total Dust (g)	Endotoxin Concentration*	Conc. EU/m <sup>2</sup>
Vac-01 District Court Clerk's Office	0.1	2	0.256	130000 EU/g	17000 EU/m <sup>2</sup>
VAC-02 Hallway 75 Outside rm's	0.1	2	0.561	42000 EU/g	12000 EU/m <sup>2</sup>
VAC-03 NE Corner of Hall 95	0.1	2	1.451	23000 EU/g	17000 EU/m <sup>2</sup>
Vac-04 Room 14 @ Door to Room	0.1	2	0.54	16000 EU/g	4300 EU/m <sup>2</sup>
VAC-05 Room 35 South West	0.1	2	1.051	13000 EU/g	7000 EU/m <sup>2</sup>
VAC-6 Room 56 Outside Room	0.1	2	0.32	26000 EU/g	4200 EU/m <sup>2</sup>
VAC-07 Room 123 Outside Room 121	0.1	2	0.612	44000 EU/g	14000 EU/m <sup>2</sup>
VAC-08 Room 143-Center	0.1	2	0.594	34000 EU/g	10000 EU/m <sup>2</sup>
VAC-09 Hall Outside Rm 237 + 238	0.1	2	0.399	55000 EU/g	11000 EU/m <sup>2</sup>
VAC-10 Rm. 3556-Center	0.1	2	0.503	21000 EU/g	5200 EU/m <sup>2</sup>
VAC-11 Hall Outside Rm 324	0.1	2	0.788	38000 EU/g	15000 EU/m <sup>2</sup>
VAC-12 Rm. 210-Center	0.1	2	0.229	21000 EU/g	2400 EU/m <sup>2</sup>

## Chain-of-Custody and Analysis Request Form

P&K Microbiology Services  
1936 Olney Avenue  
Cherry Hill, NJ 08003  
Tel: 856-489-4455  
Fax: 856-489-4085  
PNK@stl-inc.com



P&K Microbiology Services, Inc.  
The Environmental Microbiology Specialists

P&amp;K Report No.:

(P&amp;K USE ONLY) 750 608 1009

Fax Report (X) or Email Report ( )

Fax No.: 802-434-2160

P&amp;K Client: ATC ASSOCIATES INC.

Email address:

TBRIDG@ATC-ENVIRO.COM

Project ID:

63.03505.0035

Address:

15 EAST MAIN STREET,

Telephone No.:

802-434-2113

Date sampled:

8/23/06

Contact Person:

TOM BRIDG

P.O. No.:

Sample ID	Sample type, sampler used (air) <sup>1</sup>	Air volume <sup>2</sup> (L) or Area (in <sup>2</sup> )	Water		Sample Location	Analysis Requested	Turnaround Time <sup>3</sup>		Special Instructions <sup>4</sup> & Comments
			Potable	Non-potable			Same day	24 to 48 hr	
VAC-01	VAC BAG	2 M <sup>2</sup>	N/A	→	District Court, Clerks Office Between Court and Hallway 75 OUTSIDE RM's 79 + 77	P&K BSA			
11-02		2 M <sup>2</sup>			NE Corner of Hall 95	and P&K 120			
-03		1.69 M <sup>2</sup>			Room 14 @ Door to Room 15				
-04		2 M <sup>2</sup>			Room 35 South West Corner				
-05		2 M <sup>2</sup>			Room 56 OUTSIDE Room 57				
-06		2 M <sup>2</sup>			Room 123 OUTSIDE RM. 121				
-07		2 M <sup>2</sup>			Room 143 - CENTER				
-08		2 M <sup>2</sup>			HALL OUTSIDE RM. 237 + 238				
-09		2 M <sup>2</sup>			RM. 356 - CENTER				
-10		2 M <sup>2</sup>			HALL OUTSIDE RM. 224				
-11		2 M <sup>2</sup>			RM. 210 - CENTER				
-12		2 M <sup>2</sup>							

<sup>1</sup> Please indicate air sampler used (ie: AOC, Andersen, Allergenco, Biosis, Burkard, Cyclex, Micro 5, Rodac, SAS, gravity, etc.).

<sup>2</sup> Please make sure to provide essential information: air volume or surface area in inch<sup>2</sup> so that a complete report can be generated.

<sup>3</sup> Turnaround Time: Please indicate desired turnaround time (ie: Rush or Standard).

<sup>4</sup> Please indicate specific requirements: incubation temperature, media selection, FULL SPECIATION.

Please retain a copy of the filled form for your records.

Please note there is a surcharge for any rush turnarounds.

Not all analysis can be rushed.

Submitted by: (sign)

(print) DAGAN AVAN-OLJE

Date Submitted:

8/25/06

Received by: (sign)

(print)

Date and time received:

8/25/06

(For lab use only) Samples processed by:

Date:

8/23/06

Rev. 4.1 (Feb 2004)

**APPENDIX D**  
**Microbial Bulk Sampling Results**

Client: ATC Associates, Inc., Richmond, VT 05477  
Project ID: 63.03505.0035  
Date Sampled: 08/23/2006  
Contact: Tom Broido  
P&K Report Number: 750-608-1008  
Date of Incubation: 08/28/2006  
Date Analysis Completed: 09/05/2006



Fungal Analysis (Culture Method)

Bulk Samples

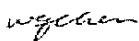
P&K Sample ID Client Sample ID Location	Weight Used (g)	Medium Used	Dilution Factor	Fungal ID	Colony Counts	Conc. ** (CFU/g)	Percentage*
1 FB-01 Ceiling Tile in Rm 343	0.107	MEA	4100	Fungi Ulocladium botrytis	43	1,650,000 Total: 1,650,000	100 100
2 FB-02 Ceiling Tile in Hall	0.245	MEA	100	Fungi Alternaria alternata	32	13,100 Total: 13,100	100 100

The sample(s) in this report was/were received in acceptable conditions.

\* Percentage of each group of fungi/bacteria in total population.

\*\* Concentration is rounded to two significant digits. Concentration is in CFU/Sample if sample amount/area is NA.

Media types: Actinomycete Isolation Agar (AIA), cornmeal agar(CMA), 2% malt extract agar(MEA), inhibitory mold agar(IMA), pseudomonas isolation agar(PIA), rose bengal agar(RBA), sabouraud dextrose agar(SDA), tryptic soy agar(TSA), nutrient agar(NTA), blood agar(BAP), staphylococcus medium 110(Staphy), phenylethyl alcohol agar w/ 5% sheep blood (PEA), plate count agar(PCA). The detection limit of fungal and bacteria analysis using culture methods is one colony. The quantitation limits vary from analysis to analysis and from processing procedure to processing procedure. Contact us to determine your quantitation limits.

  
\_\_\_\_\_  
Lab Review

  
\_\_\_\_\_  
Final Review



**P&K Microbiology Services, Inc.**  
The Environmental Microbiology Specialists

**P&K Report No.:**

Fax Report (~~X~~) or Email Report ( )

**(P&K USE ONLY)**

Fax No.: 802-434-2160

BENNINGTON STATE OFFICES

**P&K Client:**

Email address: T.Bröidö@ATL-Enviro.Gam

**Project ID:**

Address:

Telephone No.: 802-434-2113

Date sampled:

12:

Diamond, VT 05477

Contact Person: Tom Braid

P.O. No.:

[illegible]

Please retain a copy of the filled form for your records.

Please indicate air sampler used (ie: AOC, Andersen, Allergenco Biosis, Burkard, Cyclex, Micro 5, Rodac, SAS, gravity, etc.).

Please make sure to provide essential information: air volume or surface area in inch<sup>3</sup> so that a complete report can be generated.

**Turnaround Time:** Please indicate desired turnaround time (ie: Rush or Standard).

Please indicate specific requirements: incubation temperature, media selection. **FULL SPECIATION.**

Submitted by: (sign)

(print) DAGAN ALLANDY JE

Date Submitted:

70/25/06

Received by: (sign)

```
print)
```

**Date and time received:**

For lab use only) Samples processed by:

~~Date:~~

5715

Rev. 4.1 (Feb 2004)

## **APPENDIX E**

### **Metals and Pesticide in Dust Wipe Sampling Results**

# LABORATORY ANALYSIS REPORT

ESIS Environmental Health Laboratory

100 Sebethe Drive, Suite A-5

Cromwell, CT 06416

(860) 635-6475 or (800) 243-4903



State of Connecticut Approval #PH 0510

Lab Accreditations: AIHA and ELLAP Lab #100127

To: Tom Broido

ATC Assoc.

15 East Main St. P. O. Box 3

Richmond, VT 05477

Report #: C0624002

P.O. No.: 63.03505.0035

Bennington State Offices

Date Received: 8/28/2006

Date Reported: 9/12/2006

Page 1 of 2

Analysis: Metal Wipes

Analytical Method: Inductively Coupled Plasma; Modified OSHA ID 125

Sample Number	Wipe Area (sq. ft.)	Component	ug	ug/ft <sup>2</sup>
MW-02	1.00	Lead	16.8	17
		Beryllium	<0.0150	<0.015
MW-03	1.00	Lead	5.40	5.4
		Beryllium	<0.0150	<0.015
MW-04	1.00	Lead	4.24	4.2
		Beryllium	<0.0150	<0.015
MW-05	0.630	Lead	39.0	62
		Beryllium	<0.0150	<0.024
MW-06	0.440	Lead	16.7	38
		Beryllium	<0.0150	<0.034
MW-07	0.500	Lead	19.7	39
		Beryllium	<0.0150	<0.030
MW-01	---	Lead	<0.750	Reporting Limit: 0.750 ug
		Beryllium	<0.0150	Reporting Limit: 0.0150 ug

The quality control provisions of the above method were met.

Unless noted otherwise above, the condition of samples on receipt was acceptable.

Analyst: Carol Feyerabend

Date: 9/12/2006

**LABORATORY ANALYSIS REPORT** (continued)ESIS Environmental Health Laboratory  
(860) 635-6475 or (800) 243-4903Report No.: C0624002

Page 2 of 2

Analysis: Permethrin

Analytical Method: High Performance Liquid Chromatography; EHL In-House - Glass Fiber Filter

Sample	Wipe Area			
Number	(ft <sup>2</sup> )	Component	ug	ug/ft <sup>2</sup>
PW-02	0.108	Permethrin	<1.50	<14
PW-03	0.108	Permethrin	<1.50	<14
PW-04	0.108	Permethrin	<1.50	<14
PW-05	0.0860	Permethrin	2.59	30
PW-06	0.0860	Permethrin	<1.50	<17
PW-07	0.0860	Permethrin	<1.50	<17
PW-01 Blank	---	Permethrin	<1.50	Reporting Limit: 1.50 ug

Samples analyzed by liquid chromatography are quantitated by the matching retention times of sample peaks with those of known compounds. A matching retention time is not proof of chemical identity.

Unless noted otherwise above, the condition of samples on receipt was acceptable.

Analyst: David H. DinhDate: 9/12/2006

<b>Environmental Health Laboratory</b> ESIS Risk Control Services One of the ACH Group of Companies 100 Sebethe Drive Suite A-5 Cromwell, CT 06416 (860) 635-6475; (800) 243-4908 FAX (860) 635-6750 <b>REQUEST FOR ANALYTICAL SERVICES</b> (Please fill all blanks to help us better serve you)		<div style="font-size: 2em; font-weight: bold;">8/23/06</div>		<input checked="" type="checkbox"/> <b>Standard TAT 8/20/06</b> <input type="checkbox"/> <b>3 Day RUSH TAT</b> <input type="checkbox"/> <b>Next Day RUSH TAT</b> <input type="checkbox"/> <b>Same Day RUSH TAT</b> Please call ahead for RUSH analysis. Additional charges apply.		<b>FOR LAB USE ONLY</b> Lab Report No. <b>00624002</b> <input type="checkbox"/> Und <input type="checkbox"/> SRF <input type="checkbox"/> AR <input type="checkbox"/> ESIS <input type="checkbox"/> Z <input type="checkbox"/> Claims Pol. Or Con. No.																																																																																																																																														
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Name: <b>TOM BRIDGES</b>				Name: <b>SAME</b> * No charge for																																																																																																																																																
Company: <b>ATC ASSOCIATES INC.</b>				Company: <b>blanks per</b>																																																																																																																																																
Mailing Address: <b>15 EAST MAIN ST., PO BOX 3</b>				Mailing Address: <b>Jim Kenny</b>																																																																																																																																																
City, State, Zip: <b>RICHMOND, VT 05477</b>				City, State, Zip:																																																																																																																																																
PO#, Ref # (If Required): <b>63.03505.0035</b>				Phone No: <input type="checkbox"/> Phone Results																																																																																																																																																
Accts. Payable Phone No: <b>802-434-2113</b>				Fax No: <input checked="" type="checkbox"/> Fax Results																																																																																																																																																
Accts. Payable Fax No: <b>802-434-2160</b>				Email: <b>TBRIDGES@ATC-Enviro.com</b> <input checked="" type="checkbox"/> Email Results																																																																																																																																																
Sampling Location: <b>BENNINGTON STATE OFFICES</b>				Sampling Media: <b>Ghost Wipes / GFF Filters (Wipes)</b>																																																																																																																																																
Product Manufactured/Service Rendered:				Sampling Method: <b>WIFE</b>																																																																																																																																																
<b>CHAIN OF CUSTODY</b>		Collected by (print): <b>DAGAN ARADYCE</b>		Collector's Signature: <i>[Signature]</i>																																																																																																																																																
		Relinquished by: <i>[Signature]</i>		Received by:		Date/Time																																																																																																																																														
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		Method of Shipment: <b>Fed-Ex</b>		Received at Lab by: <b>Shawn Newell</b>		Date/Time: <b>8/28/06</b>																																																																																																																																														
Authorized by: _____ Date: _____				Sample Condition Upon Receipt: <input checked="" type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <b>AGW</b>																																																																																																																																																
<table border="1" style="width:100%; border-collapse: collapse; font-size: 0.8em;"> <thead> <tr> <th rowspan="2">SAMPLER NO. (Lab Use Only)</th> <th rowspan="2">SAMPLE CONTAINER NO.</th> <th rowspan="2">Media Type</th> <th rowspan="2">ANALYSIS DESIRED (A 3 day lead time is required for analysis of more than 3 different types of analysis requested)</th> <th rowspan="2">NOTE (Record the sampling date, location and operation. Other compounds present, etc.)</th> <th rowspan="2">SAMPLE AREA (Square Feet)</th> <th colspan="3">SAMPLING TIME</th> <th rowspan="2">ASH SAMPLE VOLUME (liters)</th> </tr> <tr> <th>Start</th> <th>End</th> <th>Total Time (minutes)</th> </tr> </thead> <tbody> <tr> <td>✓ MW-01</td> <td></td> <td>Ghost Wipe</td> <td rowspan="7">Analysis for lead and beryllium</td> <td>Field Blank</td> <td>N/A</td> <td>1632</td> <td>N/A</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>✓ MW-02</td> <td></td> <td></td> <td>Room 90 - Supply register</td> <td>1 Ft<sup>2</sup></td> <td>1638</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ MW-03</td> <td></td> <td></td> <td>Room 46 - Supply register</td> <td>1 Ft<sup>2</sup></td> <td>1655</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ MW-04</td> <td></td> <td></td> <td>Room 16 - Supply reg.</td> <td>1 Ft<sup>2</sup></td> <td>1710</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ MW-05</td> <td></td> <td></td> <td>Rm. 210, East Supply reg.</td> <td>0.63 Ft<sup>2</sup></td> <td>1719</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ MW-06</td> <td></td> <td></td> <td>Hall outside Rm. 237, Supply reg.</td> <td>0.44 Ft<sup>2</sup></td> <td>1755</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ MW-07</td> <td></td> <td></td> <td>Rm. 356 NE Supply reg.</td> <td>0.50 Ft<sup>2</sup></td> <td>1810</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ PW-01</td> <td></td> <td>GFF Filter</td> <td rowspan="7">Analysis for Permethrin</td> <td>Field Blank</td> <td>N/A</td> <td>1630</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ PW-02</td> <td></td> <td>WIFE</td> <td>Room 90 - Supply register</td> <td>100 cm<sup>2</sup></td> <td>1636</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ PW-03</td> <td></td> <td>W/Airline</td> <td>Room 46 - Supply register</td> <td>100 cm<sup>2</sup></td> <td>1646</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ PW-04</td> <td></td> <td></td> <td>Room 16 - Supply register</td> <td>100 cm<sup>2</sup></td> <td>1702</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ PW-05</td> <td></td> <td></td> <td>Rm. 210, East Supply register</td> <td>80 cm<sup>2</sup></td> <td>1719</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ PW-06</td> <td></td> <td></td> <td>Hall outside Rm. 237, Supply reg.</td> <td>80 cm<sup>2</sup></td> <td>1747</td> <td></td> <td></td> <td></td> </tr> <tr> <td>✓ PW-07</td> <td></td> <td></td> <td>Rm. 356 NE Supply reg.</td> <td>80 cm<sup>2</sup></td> <td>1803</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>								SAMPLER NO. (Lab Use Only)	SAMPLE CONTAINER NO.	Media Type	ANALYSIS DESIRED (A 3 day lead time is required for analysis of more than 3 different types of analysis requested)	NOTE (Record the sampling date, location and operation. Other compounds present, etc.)	SAMPLE AREA (Square Feet)	SAMPLING TIME			ASH SAMPLE VOLUME (liters)	Start	End	Total Time (minutes)	✓ MW-01		Ghost Wipe	Analysis for lead and beryllium	Field Blank	N/A	1632	N/A	N/A	N/A	✓ MW-02			Room 90 - Supply register	1 Ft <sup>2</sup>	1638				✓ MW-03			Room 46 - Supply register	1 Ft <sup>2</sup>	1655				✓ MW-04			Room 16 - Supply reg.	1 Ft <sup>2</sup>	1710				✓ MW-05			Rm. 210, East Supply reg.	0.63 Ft <sup>2</sup>	1719				✓ MW-06			Hall outside Rm. 237, Supply reg.	0.44 Ft <sup>2</sup>	1755				✓ MW-07			Rm. 356 NE Supply reg.	0.50 Ft <sup>2</sup>	1810				✓ PW-01		GFF Filter	Analysis for Permethrin	Field Blank	N/A	1630				✓ PW-02		WIFE	Room 90 - Supply register	100 cm <sup>2</sup>	1636				✓ PW-03		W/Airline	Room 46 - Supply register	100 cm <sup>2</sup>	1646				✓ PW-04			Room 16 - Supply register	100 cm <sup>2</sup>	1702				✓ PW-05			Rm. 210, East Supply register	80 cm <sup>2</sup>	1719				✓ PW-06			Hall outside Rm. 237, Supply reg.	80 cm <sup>2</sup>	1747				✓ PW-07			Rm. 356 NE Supply reg.	80 cm <sup>2</sup>	1803			
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✓ MW-04				Room 16 - Supply reg.	1 Ft <sup>2</sup>	1710																																																																																																																																														
✓ MW-05				Rm. 210, East Supply reg.	0.63 Ft <sup>2</sup>	1719																																																																																																																																														
✓ MW-06				Hall outside Rm. 237, Supply reg.	0.44 Ft <sup>2</sup>	1755																																																																																																																																														
✓ MW-07				Rm. 356 NE Supply reg.	0.50 Ft <sup>2</sup>	1810																																																																																																																																														
✓ PW-01		GFF Filter	Analysis for Permethrin	Field Blank	N/A	1630																																																																																																																																														
✓ PW-02		WIFE		Room 90 - Supply register	100 cm <sup>2</sup>	1636																																																																																																																																														
✓ PW-03		W/Airline		Room 46 - Supply register	100 cm <sup>2</sup>	1646																																																																																																																																														
✓ PW-04				Room 16 - Supply register	100 cm <sup>2</sup>	1702																																																																																																																																														
✓ PW-05				Rm. 210, East Supply register	80 cm <sup>2</sup>	1719																																																																																																																																														
✓ PW-06				Hall outside Rm. 237, Supply reg.	80 cm <sup>2</sup>	1747																																																																																																																																														
✓ PW-07				Rm. 356 NE Supply reg.	80 cm <sup>2</sup>	1803																																																																																																																																														
FOR LAB NOTES ONLY:																																																																																																																																																				

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